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Studies on the
Mentally Handicapped
Child

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Based on lectures originally given at the
Department of Language and Social Studies,
the Harris College, Preston, Autumn 1965

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Editor's Note

This book is based on a series of lectures given at the Harris College, Preston, Autumn 1965, whilst the editor was tutor to the course for training of teachers of the mentally handicapped child.

Reading
1968

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Introduction

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It is fair to say that, until recently, the mentally handicapped have been the most neglected group in our society. This neglect led to the development of powerful circular arguments suggesting that since they did not show much gain from inadequate care, little could be done for them. In recent years, however, the situation has begun to change for the better due to the combined influences of social reform and scientific advance. The Royal Commission, 1954–1957; the Mental Health Act, 1959; The Report of the Sub-Committee on The Training of Staff of Training Centres for the Mentally Subnormal, 1962; The Ministry of Health's "*Health and Welfare: the Development of Community Care*", 1963; and finally the setting up of the Training Council for Teachers of the Mentally Handicapped, 1964, were all landmarks in the development of services for the mentally subnormal. The greatest need is now to develop remedial measures on the basis of carefully controlled research. Although we remain in considerable ignorance of the upper limits to improvement in the subnormal it is already clear that these are higher than formerly thought.

The study of mental subnormality is a meeting point for a large number of disciplines: biochemistry, education, genetics, neurology, psychiatry and psychology all have some part to play. Indeed, major advances have recently occurred in many of these fields and more has been achieved in the understanding of the nature and causes of mental handicap during the last fifteen years than in the previous century during which serious study commenced. Work in this field is not only rewarding for its immediate theoretical or practical interest, but also has its bearing upon the wider study of mankind. As Penrose has put it, 'these unfortunate mentally handicapped individuals can reveal, unwittingly, information of the utmost value to the rest of the human community, and we may well be grateful to them for this service'.

Mental subnormality poses the linked problems of prevention and amelioration of the many conditions which are included within the overall classification. This book, written by specialists from different disciplines, emphasises the latter problem mainly in the context of severe subnormality. Much recent work is reviewed and the Editor is to be congratulated on persuading his colleagues, drawn mainly from the Universities of Liverpool and Manchester, to put their lectures into print. Teachers of the mentally handicapped will find all these contributions useful in offering an over-view, and the book will also prove helpful to parents.

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I

Education and the handicapped—a historical survey

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It is now generally recognized that the school has a wider function than the mere inculcation of knowledge. It has, as the Newsom Report (1963) emphasized, a duty to prepare its pupils to meet their environment. Special schools for handicapped children have for long realized this. Indeed they have led the way by showing how children should be assisted to become good parents, workers and citizens, and how even the most severely handicapped may become fit to live with other people and fit for other people to live with them. But it was not always so. It was certainly not so in the nineteenth century, nor even in the early decades of this century.

In 1920 Mary Dendy, an assiduous worker on behalf of the mentally handicapped, writing of the first residential special school for feeble-minded children, had the following to say: 'As to writing, I confess to being sceptical of its value. In at least one great institution, the knowledge of how to write has led to great difficulties in managing high grade cases, the men and women communicating with each other by means of notes.' (Lapage, 1920). This view of Miss Dendy's reflected her philosophy regarding the mentally handicapped. Unable to fend for themselves, they might well be imposed upon by society, and therefore needed to be protected from society. With this in mind she established, in 1898, the Lancashire and Cheshire Society for the Permanent Care of the Feeble-Minded. The aim of the Society, as its title suggested, was to afford a refuge for the mentally defective. Instead of living in the world they would be withdrawn from it; instead of being battened upon by society they would be protected from it; instead of being integrated into the community they would be segregated from it. Consequently, since they would not be a part of society they would not require the tools of society, of which writing was one.

Mary Dendy and her Society were in fact merely giving expression to the attitude towards the handicapped which had existed throughout the nineteenth century, indeed since their education had first started at the end of the eighteenth century. This attitude was exemplified in the term 'asylum', for not only did it summarize the prevailing outlook but it was also frequently used in the title of the earlier special schools.* This was not because the children attending them were necessarily feeble-minded but because these schools looked upon themselves as sanctuaries from the cold, cruel and inhospitable world. In those days handicapped children were frequently exhibited for begging purposes on street corners, sometimes with sores artificially produced, the more to arouse the sympathy of passers-by.

Nor was the begging confined to the streets. One school for physically handicapped children admitted a boy whose mother owned a small sweet shop. Whilst he lived at home he was generally placed in a prominent position in the shop, rather for exhibition than utility, for he was only required to look miserable (Charity Organization Society, 1893). Soon after his admission to the school his mother complained that receipts were falling rapidly, as customers had been attracted to the shop by sympathy for the boy; that now he had left, many of them ceased to deal with her. Therefore, she wanted him back.

Hence the earlier schools for the blind, the deaf and the mentally and physically handicapped were residential institutions in which the children were shut away and cut off from the outside world. In 1890 a London special school stated that its object was 'to receive for three years—board, and clothe, and educate on Christian principles—destitute, neglected, or ill-used crippled boys' (Charity Organization Society, 1893). Once a child was admitted he was not allowed to leave during the whole of the three years. Apart from walking out with the Matron for exercise, he never left the building. He could have a visitor once in three months. He could write a letter once a month. Otherwise he was excluded from the outside world. Similarly, at the Asylum for the Deaf in the Old Kent Road,

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* The first school for blind children, established in Liverpool in 1791, was called The Asylum for the Indigent Blind; the first for the deaf, established in London in 1792, was the Asylum for the Support and Education of the Deaf and Dumb Children of the Poor.

London, no child left the school in term time save to attend church (Hodgson, 1953). While at the London School for the Indigent Blind, children 'who had friends joined them for a week at Xmas and Midsummer' (Bartley, 1871). But not all had friends.

This isolation from the outside world, this lack of contact with normality, this asylum principle was one of the worst features of the education of the handicapped during the nineteenth century. It was also the first and major characteristic of their education. The second characteristic was a concentration upon trade training. Almost without exception the earlier special schools had attached to them sheltered workshops. It was intended that the majority of children, when they left the schools at the age of 16, would enter the workshops. With this end in view much of the work from the age of 12 onwards was devoted to preparing the children for their entry to the workshops, and this preparatory work took place in the trade training departments of the schools. At the outset this scheme was fairly satisfactory but as more and more children passed through the schools so the workshops became fuller and fuller, until eventually only a small proportion of those leaving the schools could enter the workshops. Nevertheless, the trade training departments continued to assume that the children would be entering the workshops, and concentrated on the trades that were practised therein. Even this would not have been too damaging if the trades for which they were trained could have been economically followed in the outside world. But they could not. They were the traditional trades associated with the handicapped—mat, mattress, basket and whip-lash making—trades which lent themselves more to sheltered than to open industry. Thus although an attempt was made to provide some form of vocational training, it was based on the false assumption that the handicapped would be permanently institutionalized, and therefore many children left the schools prepared neither for life nor for earning their living.

The third characteristic was a concentration on, almost a preoccupation with, religion. Apart from their desire to protect the handicapped, the founders of, and subscribers to, the first schools were frequently moved by religious conviction. Methodism and Evangelism both played a part. The former was not confined to the followers of Wesley, but it was a way of life devoted to self-discipline and work for others, as well as attendance at church and chapel. It was to be found among the trading and professional classes, whose Puritanism impelled them to charitable works so that God would not be deprived, through the poverty and ignorance of man, of the glory that was justly His. Evangelism, too, had an other-wordly ideal. Little concerned with the evils and sufferings of the present life, it was greatly concerned with the salvation of the individual (Pritchard, 1963).

Consequently, there was much emphasis on religion in most of the earlier schools. On Sundays at the Yorkshire Institution for the Deaf and Dumb at Doncaster even the youngest children studied the Gospels from 6.30 to 8.00 a.m., 3.00 to 5.00 p.m., and 5.30 to 7.30 p.m. In addition, they attended public worship from 10.00 to 11.30 a.m. and from 11.40 a.m. to 1.00 p.m. (Hodgson, 1953). Entries in the annual reports of other institutions confirmed the religious preoccupation. In 1838 the Ulster Institution for the Deaf and Dumb and the Blind, Belfast, recorded that:

> 'A little mute, in his 8th year, a day scholar, was unfortunately killed at one of the Factories before he could have known the revealed will of God. Very different, however, were the circumstances of a poor blind boy, who died about the same age. He was delicate and deformed; but during a lingering and painful illness, he discovered a vigour of mind, an eagerness for spiritual instruction, a meekness of disposition, which gave satisfactory evidence of a saving change of heart' (Ulster Society for Promoting the Education of the Deaf, 1839).

Ten years later another institution noted that:

> 'A blind Irish girl, suffering from great delicacy of health, was received into the school two years prior to her death, under peculiarly providential circumstances. It was deeply interesting to her Christian friends to remark how gradually she was led from the errors of Romanism to the pure doctrines of the word of God, by a blessing on the power she acquired to search the Scriptures for herself' (Ritchie, 1930).

The motives were not therefore always altruistic. Proselytism sometimes played a part. However, it is likely that the main underlying reason could have been put into (though it probably never was) the following words: 'This poor child is going to fail in this world, we will make quite sure that he does not fail in the next.' Part of this sentiment is admirable but the ready acceptance of failure is to be deprecated. Success must be sought now and hereafter.

The final characteristic of the education of the handicapped was that during most of the nineteenth century their schools were neither provided nor assisted by the State. They were voluntary in the fullest sense of the word and dependent upon the contributions of subscribers. Moreover, they were not backed by either of the major voluntary societies—the National Society and the British and Foreign Schools Society—which had been providing schools since the beginning of the century. These two societies had been receiving grants from the State since 1833. In 1870 they were joined in the provision of schools by the school boards which, in addition to State grants, were given the power of raising a rate. But the State still made no contribution towards the education of the handicapped. It was not until 1885 that the State took its first official, tentative step in this direction, by appointing a Royal Commission. When the Commission reported four years later, it recommended that a duty should be laid upon school authorities to ensure that blind and deaf children received an education. It further recommended that mentally handicapped children should be given special educational treatment (Report of the Royal Commission, 1889).

The first recommendation was implemented in an Act of 1893, the Elementary Education (Blind and Deaf Children) Act, which made the education of the blind and deaf compulsory. The second recommendation was ignored. This was unfortunate since, apart from the principle involved, acceptance of the details of the Commissioners' recommendations might have had far-reaching repercussions. In essence, what the Commissioners suggested was that school authorities should be responsible for the education of feeble-minded and imbecile children.* Of the imbeciles, there were some (though it was not known how many) who required special educational arrangements to develop such faculties as they had. With considerable insight, the Commissioners suggested the form that these arrangements might take. Although education was possible, the ordinary means of giving it would be quite unsuitable. Some of the children might eventually aspire to the three R's, but of greater importance were the essential preliminaries, sense and muscle training. There should be much physical activity designed to correct the low vitality and generally poor physical condition of the children. In the classroom itself, emphasis would be laid on the improvement of speech and the perceptive faculties, while simple manual exercises would be used to overcome imperfections in muscular co-ordination.

Imbeciles could not be educated in a special class in the ordinary school because there were too few of them to form a class, and the vast majority would require residential training. Their teachers, however, should be drawn from the ordinary schools, since the Commissioners felt that it was necessary 'to be a good teacher of ordinary children to be a good teacher of imbecile children' (Report of the Royal Commission, 1889). On the application by parents, school authorities would be responsible for ensuring the admission of educable imbecile children to institutions, and contributing towards their education. On no account should they be allowed to remain in workhouses or lunatic asylums. Where there were insufficient institutions for their reception, local authorities were empowered to establish them. Their education should be continued, if necessary, until they were 21, and every effort should be made in the institutions to ensure that the educable imbeciles were separated from those of lower grade.

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* Although these terms have been replaced since the Mental Health Act 1959, they are used here in the interests of historical accuracy.

All this was most enlightened. The application of the term 'educable' to imbecile children, the suggestion that their education should come within the purview of the school authorities, and the recommendation that they should be taught by fully trained teachers, were all ahead of the practice of the time. For that matter they were ahead of the practice of today. Children excluded from school are still too frequently termed ineducable; responsibility for their education lies with the local health rather than the local education authority; their teachers, admirable though they are, have neither the qualifications nor the salary of ordinary teachers.

Regarding the feeble-minded, the Commission had rather less to say. Its one firm suggestion was that they should be separated from ordinary children, so that they might be given special instruction. What form the instruction was to take, and where it was to be given, was not specified. It merely indicated that the attention of school authorities should be particularly directed towards its suggestion.

The Government, however, took no steps to draw the attention of authorities to the suggestion, though a number of progressive authorities became aware of it and, without waiting for a lead from Whitehall, established special schools for feeble-minded children. Faced with a *fait accompli*, the Government in 1896 appointed a committee of inquiry—the Departmental Committee on Defective and Epileptic Children. However, no similar action forced the Government's hand in respect of imbecile children, and little was done for them for another quarter of a century.

The little that was done for them was in the idiot asylums. The first of these had been established in 1847 at Park House, Highgate, and eight years later moved to Earlswood Common, Redhill. It was visited in 1887 by members of the Royal Commission on the Blind and Deaf. They found 570 inmates, the majority of whom were adults. Of the children present, the Commissioners discovered 2, both deaf, about whose subnormality they had grave doubts. One could lip-read; the other read by the manual alphabet to some of the Commissioners. This confusion of deafness with idiocy was a constant danger, and only comparatively recently, with the development of audiometric techniques, has the danger finally receded. Nor was the danger confined to the deaf. D. H. Tuke (1882) a member of the family which did a great deal for the mentally subnormal, visited a number of idiot asylums, and recorded that mistakes were sometimes made, and children were treated as being of low intelligence when in fact they were retarded for other reasons. On the other hand, there were extremely low grade children present. Since they were all instructed together this presented difficulties. Earlswood overcame the difficulties with ease. 'Those incapable of further instruction are taught merely to sit still in school', noted the Commissioners (Report of the Royal Commission, 1889). Other idiot asylums were soon opened. One of these was the Royal Albert at Lancaster where the Commissioners might have been more satisfied with the training of the most inert imbeciles. They sat in a row, and the teacher threw bean bags at them until they put up their hands to defend themselves. They were then persuaded to throw the bags back.

By 1870 5 asylums had been established; only 2 of these would admit imbecile pauper children, many of whom were still to be found in the workhouses and workhouse infirmaries. In 1878 the Metropolitan Asylum Board opened an institution at Darenth for such children in the London area. Because the accommodation was limited, the original children were all selected, all higher grade and all capable of being educated. After 1880, however, more buildings were erected, and the mental capacity of the children admitted became lower. Consequently, the number of children who, in the opinion of the authorities, were helpless and unimprovable increased and the proportion of children attending the school decreased. Thus by 1887, of the 600 children on the so-called school side of Darenth only 362 were receiving any form of education (Report of the Royal Commission 1889). Ten years later there were 1,000 persons on the school side, of which 323 actually attended the school. Of the remainder, some were children and some adults, and all were supposedly hopeless cases. The school, with its 300-odd children, consisted of only 4 classrooms and 1 large schoolroom. Nine classes were accommodated, 3 in the schoolroom and 2 in each of 2 classrooms and 1 in each of the remaining 2. There were other shortages, too. The staff was made up of the headmistress who did not teach, 2 assistant mistresses, 6 attendants and 3 monitors. The attendants also helped in the residential blocks and the monitors were ex-pupils of the school (Report of the Departmental Committee, 1898).

Under conditions like these it was obviously very difficult to do justice to either the severely mentally handicapped or their education. The case for reform or an enquiry leading to reform was strong. It was not until 1904 that the enquiry came in the shape of the Royal Commission on the Care and Control of the Feeble-Minded. The reform took even longer.

First the Government examined the case of those children for whom the more progressive school boards had established special schools. The Committee of Inquiry which reported in 1898 made 5 major recommendations (Report of the Departmental Committee, 1898).

Firstly, it stated that the children falling within its terms of reference should be called defective children. If their handicap was physical they would be known as physically defective, if mental, mentally defective. In the same way, the schools they would attend should be called schools for physically defective and mentally defective children. These were unfortunate terms, and the stigma associated with them, although tempered by the Education Act of 1944, still affects the present-day special schools for the physically handicapped and the educationally subnormal.

Secondly, the Committee suggested that the selection of children for a special school should be undertaken by a doctor. They took this view for a number of reasons. Although teachers in most of the existing special schools did in fact select the children for their schools and although some of these teachers gave evidence before the Committee, they were in the main unable to convince the Committee that the selection was carried out on any rational principle. This was partly because some of the teachers had difficulty in expressing themselves and partly because they were unfamiliar with the scientific or pseudo-scientific terms—the jargon—which can so impress a committee. The medical witnesses, however, were under no such disability. They expressed themselves freely and clearly, within the limits imposed by the use of jargon. Moreover, some of them claimed that they could detect mental deficiency by physical signs. Among other things, they looked for malformation of the head, a V-shaped palate, large, coarse outstanding ears, a fixed stare, a curved little finger, and distractability noticeable by a constant movement of the eyes. There was slight disagreement among the witnesses as to the exact signs which would reveal mental weakness, but there was complete agreement that only medical men were capable of diagnosing it.

In view of the extent of this evidence, the prestige of the witnesses, and the fact that no non-medical witness suggested any other method, the Committee made their recommendation that children suspected of being in need of special education should be examined by a medical officer of the school authority. But they moderated it to the extent of suggesting that three other persons should be present at the examination. First, the teacher who had suggested that the child should be given special education should attend to give an account of the attainments and behaviour of the child. Second, the head teacher of the special school should be present both to receive information from the medical officer and the teacher who brought the child, and to express an opinion as to the suitability of the child for the special school. Third, H.M. Inspector for the area should be in attendance in order that he might be familiar with the details of the case. Finally, the parent of the child should be given the opportunity of attending the examination. However, despite the presence of others at the examination, the duty of recommending what educational provision would be best for the child lay with the medical officer. Thus, since psychology was in its infancy, and no means of mental measurement existed, the decision was made which has led to the present-day position whereby the recommendation concerning a child's ability is made by a doctor, and not by a psychologist or a teacher.

The remaining three recommendations made by the Committee were enlightened ones. Classes, they said, should be small, and only exceptionally should they contain more than 20 children. All head teachers should be certificated, and so should the majority of the assistants. Moreover, ordinary teaching qualifications were not considered to be sufficient. It was urged that after having had experience of work in the ordinary school, certificated teachers desiring to teach in a special school should be given special training. The duration of the course was not specified but detailed suggestions regarding the curriculum were made. The progressive views of the Committee were evident in these recommendations. At a time when classes in the ordinary schools contained as many as 70 children, 20 was a very small number to suggest. Equally, the insistence on well qualified teachers must be seen against the lack of qualifications among teachers generally, over three-quarters of whom had received no training. Finally, the inception of the advocated period of extended special training was still fifty years distant. When it did come, it contained many of the features suggested by the Committee.

The Committee's last recommendation was that attendance at a special school should be made compulsory, and school authorites should be compelled to provide special schools. In fact, the Elementary Education (Defective and Epileptic Children) Act of 1899 which gave effect to the Committee's recommendations made the establishment of special schools permissive and not mandatory. Despite this, 133 out of 328 local education authorities exercised their powers, and the schools so established did good work. It was as well that they did, since they were to provide tangible evidence to refute the contentions of a reactionary movement which was gaining strength.

This movement, which advocated the permanent institutional care of the feeble-minded, was supported by two different groups. One group claimed that the work of Sir Francis Galton in England, and of Goddard and Dugdale in the United States, tended to show that mental defectives were a danger to society. Galton (1869 and 1889) purported to show that mental ability as well as physical characteristics were inherited. His views led to the systematic study of eugenics, and were apparently supported by the findings of the American geneticists. Dugdale (1877) traced the descendants of 5 mentally defective sisters named Juke. Of the 700 he discovered, he found that over 400 of them were criminals, prostitutes or paupers. Goddard's (1912) investigation of another family at the beginning of the twentieth century produced similar results. Such findings contributed to fears of degeneration of the race, and led to demands for the segregation and sterilization of defectives.

The second group, solicitous for the welfare of the feeble-minded, also advocated their permanent care. Such advocacy necessarily implied segregation, though it was sought not as an end in itself but merely as part of the care which was essential if the feeble-minded were not to be exploited and led astray by society. It was based more on the interests of the feeble-minded than the interests of society, although the geneticists as a matter of policy supported the movement.

Thus, by the beginning of the twentieth century, there had developed a strong movement in favour of the segregation of the feeble-minded, supported by both geneticists and disinterested social workers. The strength of the movment impressed the Government, and in 1904 the Royal Commission on the Care and Control of the Feeble-Minded was appointed. When, having heard a great deal of evidence from the supporters of segregation, it reported in 1908, it was not surprising that it concluded that an institutional system, coupled with admission to the institution at an early age, was superior to the day special school system. Since there would be difficulties in transferring the children, when they left school, from one authority to another, it would be best if the local mental deficiency committees controlled all special schools, and not the local education authorities as hitherto.

However, when the time came for the implementation of some of the recommendations of the Royal Commission, there existed a body of opinion which adopted an entirely different view from the Commissioners on the value of the special schools. Surveys of leavers from the schools had shown that the children were quite capable of becoming perfectly adequate workers who neither corrupted society nor were corrupted by it. Therefore, as far as the education of feeble-minded children was concerned, the Mental Deficiency Act 1913 bore little resemblance to the recommendations of the Royal Commission. Education authorities were given the specific duty of ascertaining which children aged 7 to 16 were defective. Of those so ascertained, they had to decide which were incapable of being educated in special schools. These, and these alone, they would pass on to the mental deficiency committees. The special schools and the children attending them would remain the responsibility of the education authorities.

With regard to the mentally defective children who were incapable of being educated in the special schools, the Act provided for the supervision of those who were living at home. But it was soon seen that supervision, if it was to be of practical value, must include facilities for training. The Central Association for Mental Welfare,* established in 1914 to encourage implementation of the 1913 Act, urged its newly formed local associations to make an immediate beginning in providing such facilities. At first World War I prevented progress, but in 1919 Elfrida Rathbone opened a part-time occupation centre in the King's Cross area of London. This pioneer venture, together with two other small centres in Bath and East Ham, showed what could be done. By 1922 there were nearly a score of centres, including two established by mental deficiency committees. But the provision of centres by local authorities was extremely slow, despite the fact that the Mental Deficiency Act 1927 laid upon them the duty of providing training for defectives under statutory supervision. By 1929 only 5 centres out of 111 had been opened by local authorities. However, from the thirties onwards there was an increase in local authority centres and a decline in voluntary ones. World War II delayed expansion, but at its end local authorities recommenced building and taking over voluntary centres, and by 1959 there were only 20 voluntary centres out of 455. Finally, the Mental Health Act of that year not only reiterated the duty of local authorities to provide training centres, but for the first time gave them the power to compel attendance up to the age of 16.

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* In 1946 it amalgamated with the Child Guidance Council and the National Council for Mental Hygiene to form the National Association for Mental Health. (See Hargrove, A. L. (1965) *Serving the Mentally Handicapped*, NAMH, London.)

Considerable progress has been made since the first educational provision for mentally handicapped children started some hundred-odd years ago, but there is still much room for improvement. In particular there is a shortage of special schools for the educationally subnormal and of training centres for the severely subnormal. Equally, there is a shortage of specially trained teachers for both categories of children.

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2

*The speech development of the severely subnormal child**

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'Speech as symptomatic behaviour of mental deficiency has been but little explored,' said an American specialist (Schlanger) in 1953. Since that time a good deal has been done on both sides of the Atlantic to remedy this. Some of the more relevant and challenging findings will be discussed in this chapter.

SPEECH AND INTELLIGENCE

The lack of effective speech appropriate to their age probably marks out the severely subnormal more than any other single characteristic. Their backwardness shows in various ways. In contrast to normal children, the urge to talk seems lacking. They do not spontaneously tell of happenings or make running commentaries on their activities, or formulate their needs in words. Descœudres (1928), the great French worker in this field, noted lack of 'l'envie de parler' as one of the chief 'facts of language' in the subnormal. She also noted, and Lyle (1959a) more recently confirmed this in his own careful observations, that such children make more than usual use of gesture. When at length they achieve speech, it is often hard for others to understand, being full of elisions, mispronunciations and unfinished words. Furthermore, a crude level of expression and limited vocabulary are usual. When listening, such children cannot focus their attention except for short spells, though they certainly understand more than they can put into words. There is, however, a good deal of difference between individual subnormals in this and all other respects.

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* In this chapter the terms 'severely subnormal', 'imbecile' and occasionally the adjective 'subnormal' are used to indicate children of IQ 20–50.

Most of the above points have been the subject of research and will be taken up in detail later, but first the underlying generalization concerning a relationship, causal or otherwise, between intelligence and speech, requires attention. In normal children early and good speech development tends to indicate good intellectual status. A parallel relationship linking low intelligence and poor speech is the obvious corollary. A body of evidence supports this as fact and inadequate language is commonly taken as an important clinical sign in the diagnosis of mental deficiency. However the equation involved is far from perfect and Gottsleben rightly warns concerning this. 'As mental retardation is not an entity but results from a constellation of many factors,' it would be, he says, 'superficial to diagnose speech defect or delayed speech as caused by mental retardation.' In fact, the relationship may even work in the opposite direction, or there may be interaction between the two.

Further, modern studies reveal an anomaly which requires explanation. This resides in the fact that the speech levels of severely subnormal children, unlike those of normals, are actually consistently inferior on average to those that would be expected in the light of their measured intelligence. This was first brought clearly to notice in the work of J. G. Lyle (1959 a, b, 1960 a, b, 1961 a, b) in a series of researches. Comparing severely subnormal children with normals of like mental age, he found a significant difference on the speech front, showing that the subnormals (CA's 6½–13½, IQ's 20–50) were on average 5 months retarded on expectation. This discrepancy is of the utmost importance, theoretically and practically. Several explanations have been forthcoming. The situation may be due to brain pathology, to defective training, or to emotional causes. Let us briefly examine the evidence for these different possibilities.

1. Brain injury

'All aphasia,' according to Myklebust (1955), 'is due to a disorder of the central nervous system', whether this be caused by disease, injury, or defective development. The statement is sweeping and perhaps requires modification. The sorts of disorder connected with the three causes mentioned would surely be of very different character. Do the speech-effects show this? Diagnosis is hardly sufficiently exact for certainty. Mental deficiency classifications sometimes contrast mongols, who are readily recognizable, and non-mongols, a heterogeneous group. Alternatively, brain-injured and endogenous (familial) types may be distinguished, bringing in problems of differential diagnosis. As to the language characteristics of imbecile children in these categories, findings are few. Lyle (1959/1960) concluded that mongols (who may be presumed to suffer endogenous defective development) were more retarded in speech than non-mongols. On the other hand mongols were found to make 'more rapid and permanent' improvement in Charlotte Lubman's (1955) experiments, when compared with brain-injured children. In some ways, however, comparisons between these groups strike one as academic when the range of individuals within the groups is as considerable as is the case here. Furthermore, other factors are at work confusing the issue. For instance, in the case of mongoloid types some of their special problems of speech are not necessarily nor probably associated with cerebral injury, but are due to physique. Again, the echolalia of 'autistic' subnormal or pseudo-subnormal children, which may be due to brain lesions, is by some regarded rather as an emotional maladjustment. Thus, explanation in terms of brain injury is by no means straightforward on many counts.

2. Defective training

Defective training certainly explains much of the variation in standards of speech found in normal children. By interaction, it may also explain some of the differences in 'intelligence' that occur. The child from an educated home who hears good models and is stimulated to express himself will speak better than his contemporary who has not had such advantages. At a very early age the differences are apparent and measurable. Later they become even more evident. For example, Stern (1924), working on material collected by Descœudres, calculated that the difference between the speech of working class as compared with professional class children was equivalent to about 8 months of language development in later childhood. Modern linguistic studies have further elucidated the contrast. In the case of the severely subnormal child it is doubtful (because as yet the subject has not been fully explored), whether the milieu is capable of producing any such marked speech effects. There is, however, some evidence to suggest that more intensive and well-directed attention to the language needs of the imbecile from an early age could be helpful. The problems of training that affect the severely subnormal and his parents arise from two related facts: (a) he is not readily responsive to any form of teaching, nor does he pick things up or experiment for himself as ordinary children do; (b) again, in regard to speech, his literal infancy is so prolonged that substitutes for speech, such as gesture, tend to develop. It is a discouraging and seemingly useless task to talk to him. All too often management by other methods inevitably replaces speech. How different is the position of the normal child. If he is fortunate, he receives and responds to speech encouragement from the start and his lively curiosity and searching mind soon themselves provide the further stimulus he needs. He is relatively early in control of his environment by words and knows it. Yet in imbeciles, too, hard task as speech is for them, if the attentions of the mother are sufficiently prolonged and intelligently directed, verbal skills can sometimes be relatively well developed. The author knows, for instance, a non-mongol 10-year-old subnormal, of IQ 40, whose language almost equals that of a normal 6-year-old, by dint of consistent stimulus from her mother and young sister.

3. Emotional factors

Emotional factors play an important part in facilitating or hindering speech development in the case of normal children. Some of the same influences can operate with subnormals and have been studied. Certain types of emotional make-up seem to favour speech development. Thus Lyle (1959a) found, among the young imbeciles he observed, that the emotionally labile children talked better than the phlegmatic, timidity was a bar to progress, and the less dependent, more attention-seeking sort of child scored more success.

Studies of the effects of deprivation of family life among normals have shown that this can depress their language functioning in all sorts of ways. Institutional life can have a similar result. The capacity for affection, for emotional responsiveness, seems lowered and motivation is impaired. Among institutionalized imbeciles, who have often experienced severe deprivation before placement, a similar process may operate to produce the lowered verbal levels which they show when compared with children of like mental age who remain at home. Tizard's (1960) 'Brooklands' experiment and other evidence happily shows that this position is not irreversible. At 'Brooklands' the young ex-'institutional' severely subnormal children were treated in a homey environment and given much adult attention and good play opportunities. One of the chief results of their better situation was a gain in language skills.

Though the above factors have been discussed separately, they often in fact coexist and interact with other aspects of the situation to increase the imbecile's load of disability. Some of the better known features of his speech illustrate just this and will be discussed in the following sections.

SPEECH DEVELOPMENT

In normal children much goes on which is relevant to future speech development before the first word is spoken. Three aspects can be distinguished. The first concerns the baby's interest in sounds and his attention to them. This appears very early—Gesell and Armatruda (1949) put it in the first month of life. It is thereafter progressively refined upon. Next is his response to spoken words which shows they are meaningful to him. At 2 months, he will smile at his mother's voice or be quietened by it when he is upset. At 4 months, he will turn his head to a voice and at 7 months he responds when called by name. Third, and most obviously linked with speech, are the sounds he makes himself. Even his instinctive crying soon becomes expressive so that his mother gets to know its meaning. Presently small sounds, of comfort and discomfort, appear as well as cooing. Griffiths (1954) puts this in the third month. These infant sounds become more and more articulate, developing into babble or jargon. Myklebust (1957) calls this 'the pleasurable use of vocalization' and regards it as very important, but the quantity as well as the quality of babble varies greatly from child to child. At 9 or 10 months comes 'the great step of inventing a word'.

For the child of severely subnormal intelligence, speech development follows the same general pattern but at such a much slower pace that it is scarcely recognizable. The sense of spontaneity and thrill are lost. It is common for speech activities to be completely in abeyance even up to the end of the second year. Babble and the first word are likely to come three times as late as in the normal. Occasionally it is reported of an imbecile that he made a normal start and then gave up. Such statements are hard to verify, and for the great majority of severely subnormal children their long period of speechlessness is the major fact of their early language development.

From this follow two crucial effects. Firstly, it means that the young imbecile, being unable adequately to understand or express himself, is cut off. Even if this does not cause frustration, as it may well do, it will certainly force him to adjust at a pre-verbal infantile level to his environment. But secondly, and this is probably of much greater importance, his lack of response to speech communications from his mother and others may lead to these being withdrawn. Instead of management and contact by verbal means, physical handling and at most gesture will be used. Thus the feed-back and encouragement of a language environment is often absent for the young imbecile. A double injury is here involved for 'if language is ultimately the creation of the intellect, yet hardly less fundamentally is the intellect a creation of language' (Boome, 1939). Deprived of verbal communication the child experiences a sort of mental starvation.

As the severely subnormal child gets older the situation snowballs. His difficulties are chiefly seen in two areas: (a) in defects of articulation and other disorders of speech, and also (b) in characteristic deficiencies of vocabulary and sentence structure. These will be discussed below.

(a) Defects and disorders of speech

Defects and disorders of speech are at all ages commoner among imbeciles than among normals. Some subnormal mental conditions even have their own peculiar speech characteristics, as for example, the gruffness of the mongol, but in most cases this is not so.

In the child population at large speech defects are associated with low vitality, organic deficiencies, and hearing loss. These conditions are often present and operate in severely subnormal cases also. Tests of general articulation further show that this is significantly linked with scoring on language tests when mental and chronological ages are held constant, and that mental age is more important to progress than chronological age. These facts again have bearing on the problems of the subnormal child. Further, a tendency towards maladjustment or neuroticism on the part of parents can affect articulation and speech development in children and this interaction may occur in the home of the imbecile no less, and perhaps more, frequently than in that of the normal.

The commonest types of defect found among severely subnormal children are those of voice and articulation. The former occur in 62·1 per cent of cases according to Schlanger and are almost twice as common among boys as girls. They cover such features as monotonous voicing, husky-hoarse speech, breaking, de-nasal and nasal speech. Articulatory defects of specific kinds are also common, occurring, it is estimated, in at least 57 per cent of cases. Again, twice as many boys as girls are affected. Many of the articulatory defects noted are due to the perseverance of infantile forms of enunciation with 'elisions, substitutions and assimilations', as Lyle says. Such faults are also, of course, common in young normals, but in their case, speech rapidly increases in intelligibility. In this connection, McFarlane's five-point schedule of speech intelligibility may be quoted. As described by Lyle (1959a), this gives the following distinguishable stages:

1. that at which a child merely makes noises, gibberish;
2. that at which the enunciation is so poor as to make the speech barely comprehensible;
3. that at which the speech is consistently poor but can be understood if attended to;
4. that at which the speech shows some mild habitual defects but can be easily understood;
5. that at which the speech is clear of deficiencies and is completely intelligible.

In normals, stage 2–3 is reached at about 30 months, according to both McCarthy (1930) and Sampson (1956). By 6½ years 'the improvement in articulation', says E. A. Davis (1937) 'is great enough to indicate that the critical period is past.' Such children have reached stages 4–5, above. Studies of the amount of defect present among imbeciles give a very different picture. Varied estimates exist indicating that from 57 to 74 per cent of their speech is imperfect, and probably a majority would not pass stage 3 on McFarlane's schedule. Mainly the sorts of errors that occur are developmental and can be summed up as 'baby talk', suggesting that their origin lies mainly in the child's lack of maturity. But it must also be remembered that a degree of hearing loss is also often present in these children. Findings on this point are not in complete agreement, but a 30 per cent incidence of hearing loss [Schlanger's (1953) figures] is certainly not excessive and could account for much in the way of articulatory defect. The sorts of error found are of interest in this, and other, connections, and several psychologists have attempted classifications and analyses of these.

Descœudres, in 1928, listed five categories as follows: elisions; easy sounds for harder ones; assimilation of one sound to another;

wrong derivation of words from other words; and confusions of meaning. Not all these are pure articulatory errors, however, and Davis worked out a seven-point scale on similar lines to that of McFarlane already quoted, but more precise. Most severely subnormal children would not attain more than a middling position on this but there are important exceptions. Herd (1930) emphasizes this last point saying that 'though defective articulation is very common in defectives of all grades', yet there are 'even imbeciles' in whom no articulatory defect is noticeable.

Other studies list the sounds most frequently found to be faulty in subnormals. Thus Lapage [as quoted by Herd (1930)] records that *th*, *r*, *y*, *s*, *n*, *g*, and *ng* are hard for 'feeble-minded' subjects, who tend to substitute other sounds when these are required. They also frequently mispronounce *sh*, *t*, *l*, *f* and *v*. Very similar errors occur in the speech of normal young beginners, with whom likewise for example, '*th*, in the initial position, is by all odds the greatest stumbling block', according to Davis. It is significant, furthermore, that among the normals, she finds the best articulation among those children who are most talkative and most spontaneous in their talk.

Other defects or disorders commonly observed among severely subnormal children are stammering and echolalia. The first of these, though popularly associated with bright 'nervous' children, in fact occurs in the speech of 60 per cent of low grade (severely subnormal) and 43 per cent of high grade children according to some surveys. This is not surprising when it is realized that stammering is an almost normal phase at about 3 years and is on the whole associated with immaturity. Echolalia, a rarer phenomenon, is now often held to indicate 'autism', but its meaning is not well established in this or other syndromes. Echolalia consists in the imitation by the child of sounds he hears others make, but which he does not understand. It can be regarded as a normal, even necessary, stage of early speech development. Lord Brain (1961) apparently expects to find it at 9 to 10 months but Myklebust (1957) says 'the normal child engages in echolalia mainly between 2 and 4 years of age, with the peak occurring at approximately 3 to 3½ years.' He regards it as reflecting one of the three 'critical processes' in learning to talk. The first of these is *identification*, when the baby feels he wants to be like the talking human being. 'Babbling is the first manifestation of this identification.' The next process is *internalization* and the third is *assimilation*. 'In the normal child, this process seems to be related to and

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enhanced by echolalic behaviour.' In imbeciles, the phenomenon occurring and continuing at a later age, might possibly be regarded as yet another instance of their retardation or arrest in speech development. But in fact those most competent to judge associate it with definite brain damage. It is, says Lord Brain (1961), for example, 'likely to be the result of a lesion of the temporal lobe and the neighbouring part of the parietal lobe'. Echolalia, according to Myklebust (1957), inhibits the 'third process' of *assimilation* and 'is the organizing attempt, through persistence, to achieve adequate integration of experience.' Such a view gives the symptom a meaningful function and one which agrees with the observed fact that it tends to occur in imbeciles when they feel particularly out of their depth. Often, however, a habit factor also seems to maintain echolalic behaviour and makes it difficult to deal with.

(b) Vocabulary and sentence length

The growth of vocabulary and the increase in average length of sentences has been much studied in connection with normal children. Various methods have been used. The early investigators, such as Boyd (1914), concentrated on making records of individuals, but more recently normative studies of representative groups have been commoner. Results show a certain amount of variation, depending on the sample considered, the form of the records, and so forth, but all reveal a steady increase with age. For Gesell (Gesell and Armatruda, 1949), this increase is an index of maturity and 'in a measure, an index of intelligence also'. Tabulating his results for the early months and years, he records as typical:

at 10 months — 1 word
at 12 months — 3 words
at 24 months — 300 "
at 36 months — 1,000 "

Thereafter, vocabulary increases on average at the rate of about 500 words a year, according to Smith's (1927) findings.

In the matter of sentence length there is the same steady progression with age. Nice (1925) and Smith (1927), two of the chief American investigators of this phenomenon, consider sentence length on the whole the 'simplest criterion' of the child's general advancement in speech and language. At 2 years old, though 2-word sentences are beginning, half a child's speech is still in single word utterances. By 3 years these are largely left behind, and as time goes on he advances to sentences that are longer and more complex. There is a decrease in exclamatory forms and an increase in questions and declarative sentences. Nice outlines five stages:

1. the single word stage;
2. early sentence combinations, incomplete sentences;
3. short sentence stage;
4. transition stage;
5. the complete sentence of 6 to 8 words.

Turning to the severely subnormal, the slow and impoverished progress that is his portion is striking by contrast. His first word occurs (according to various authorities) at from 27 to 30 months, three times as late as in normals. The single-word 'sentence' continues as his main medium of expression for varying periods. Phrased speech, forming incomplete sentences, begins at about 42 to 46 months. The short-sentence stage tends to develop around 8 years. But there is no great subsequent increase in length. Schlanger, studying imbeciles of CA 8 to 16 and mean MA 6 years 8 months, found the average sentence length was 3·9 words, with little 'scatter'. The inadequate quality and quantity of the subnormals' vocabulary affects this situation. Typically they have a relatively large 'core' of common words and a reduced 'fringe' of less usual vocabulary, as well as a smaller total number of words at their disposal.

From these findings, the all-round deficiency of the language development of the imbecile is apparent. Two points, however, must be made. First, the range of individual difference should be remembered. This means that, notwithstanding average trends, there will be in any particular group some whose language capacity is far better or worse developed than that of most of the others. At the extremes the virtually mute and the very voluble confront the investigator. Thus in a study of 10 imbecile children (to which there will be further reference) the present author found a mean sentence length for the group of 2·6 words, but the individual means ranged from 1·27 to 4·02 words per sentence and some children habitually produced 5-word sentences of fair complexity. This suggests that perhaps the language disability of imbeciles is somewhat specific. The results of some attempts to improve the speech levels of severely subnormal children also points in this direction. Mueller and Smith (1964) found this in a group with whom 'language stimulation' sessions were arranged. Some advanced considerably, others not at all. The situation did not seem to reflect any discoverable differential influences.

The second point is rather opposite in kind and concerns environmental stimuli. The difficulty of eliciting the best of which the imbecile is capable in a test situation is obvious and may lead to his powers being under-rated. But also his potential is often altered by adverse life experience. Schlanger (1953, 1954), working with institutionalized and home-living groups, found both fluency and sentence length adversely affected for the former. The average institutional subnormal produced sentences of about 4 words long and said about 50 words, while the home cases produced sentences on average 5 words in length and said about 65 words in the same situation. These differences were not due to the mental level of the children but to their different environment and history. In this way imbeciles are frequently bogged down at an infantile speech level. When successfully stimulated they may prove capable of strikingly better performances than they habitually make. One boy, for instance, in the author's group, a very limited mongol (IQ 24) was said to be possessed of but one word, 'Pie'. During the course of a series of sessions designed to stimulate him to speech, a vocabulary of 102 different words emerged. There was also a general increase in the amount of his verbal output.

As with normals, too, the vocabulary and style of expression of this group of imbeciles had been shaped by their environment and reflected their interests and personality. For instance Derek, a very difficult epileptic boy who was often beyond control at the Centre, was nevertheless a cheery individual, ready to greet all and sundry. His vocabulary was distinguished by such words as 'cheerio!' 'good-bye', 'good-morning', 'hello!' 'please', 'pardon', indicating his socialization. Similarly, the pretty but moody Julie, to whom further reference will be made, being interested in feminine things, used such exceptional words as 'blouse', 'lipstick', make-up', 'powder', 'slippers', in her spontaneous conversation. Another showed his pathological anxiety in constant fantasies involving 'ambulance', 'accident', 'bandage', 'clinic', 'hospital', 'died', 'dead', 'ill', 'killed', 'murdered', 'poorly', 'sore'. Such individual records of vocabulary as these show strong emotional elements at work. Sentence making and the accumulation of words in use is not just a maturational matter, even for the imbecile.

UNDERSTANDING SPEECH

Another aspect of language of a quite distinct sort is the understanding of speech. To talk involves 'encoding'; to understand, 'decoding'. Slowness to comprehend is one of the 'facts of language' which Descœudres (1928) thinks most characteristic of the subnormal. Yet parents often claim that their imbecile children can take in 'everything'. Their claim is an exaggeration but it has some relative justification.

Understanding speech has many aspects. The very capacity to imitate, the ability to follow instructions and to direct one's own behaviour with overt or sub-vocal speech, to pass from egocentric to adapted conversation, all these to a greater or lesser degree reveal it. In normals speech imitation first shows itself at 9 to 11 months, but in severely subnormal children its appearance is always much delayed. However, the subnormal, though not as yet imitating or otherwise expressing himself, may none the less be responsive to speech up to a point, and his understanding will remain continuously in advance of his power to express. If he is asked a series of questions (as in Lyle's (1959) tests), 'Show me your shoe', 'Open the door,' he will be able to do these things before he could answer to 'What am I doing?' 'What am I touching?' when the same objects and activities are involved. Zangwill (1960) explains the primacy of understanding by the fact that it is a more automatic process than speech.

In normal children the thought processes are increasingly reinforced as their language skill develops. Speech and understanding interact to form much of what we recognize as intelligence. There is an 'intimate relation', as Labrant (1933) says, between language and the thought processes. In imbeciles, any such interaction and relation is less obvious. Luria (1961), the Russian psychologist, in fact finds this role of language relatively non-existent or greatly impoverished in their case. Certainly for imbeciles the process is in very slow motion and is impeded by the grip of infantile speech styles which have settled into rigid habits, so that language has almost ceased to be a growing point of thought. Almost, but not quite. Experiments recorded by O'Connor and Hermelin (1963) in their admirable book *Speech and Thought in Severe Subnormality*, as well as the present writer's own studies in the conversational field, suggest that appropriate speech stimulus aids the imbecile's thinking and vice versa. If he hears speech as an accompaniment to everyday and interesting situations, and is encouraged to verbalize as he plays and engages in the solution of problems, better total mental functioning as well as greater language competence appears to result.

In spite of the above tendencies, the limits of the imbecile child's understanding is a fact to be faced. His teachers and parents must take it carefully into account. Concrete vocabulary and short sentences should be the rule in addressing him. It has also been found experimentally that a loud, deliberate delivery assists his understanding and focuses his attention. The repeated association of phrase and action seem to give him greater insight into the latter, leading to more purposeful performances. All these, and other, ways of encouraging a thought-language interaction are worthwhile. Indeed, as Descœudres (1928) believed, all the subnormal's education can be regarded as a 'cours gradué de language'.

The earlier sections of this article have brought out the main characteristics of the speech of severely subnormal children in comparison with normals. The findings quoted have been generalizations based on surveys and research. The following illustrations are drawn from the writer's own experience with a group of imbeciles, studied individually. They were boys and girls attending a day Training Centre. Their ages ranged from 8 to 12 years at the start of the contact. The average group IQ was 37, ranging from 24 to 49.

As a group they were at the start unable to express themselves except in a fragmentary way and their speech was poorly enunciated. This last underwent little change during the study but on the other hand there was a steady increase in verbal output as measured in the number and length of utterances per session. This was true even in the case of the least linguistically gifted, who incidentally tended to be found among the mongols. Measured intelligence did not seem invariably relevant, two of the mongol cases, for example, being Bobby (IQ 49) and Brian (IQ 24). Bobby is particularly interesting in this connection. His play, though rather repetitive, showed gleams of imagination. He also understood the game of dominoes to some extent and dealt with jigsaws in quite a purposeful manner. He was always apt to prefer gesture to speech and sometimes used this, e.g. in showing how to top an egg, quite explicitly. He could draw in a simple fashion. As to his talk, while he often preferred silence, 2-word phrases were his typical form of expression: e.g. 'new socks' (when drawing attention to these at the start of a session) or 'school, here' (when explaining some buildings he had made). He would on occasion, however, give a complete sentence, e.g. 'Yes, I looked at it' (about a television programme) or 'I played Beatles' (describing his last evening's occupation). Always his enunciation was very slurred and lazy, perhaps partly resulting from the general poor muscular tone from which he suffered.

The abbreviated and ungrammatical nature of the speech of severely subnormal children was obvious in the productions of the group, though there was great range in this respect. Various ways of assessing oral sentence structure exist. Nice (1925) regards length as the main criterion and makes a five-fold classification as already noted when studying normal children. M. E. Smith (1927), however, analyses sentences by type—the declarative, the imperative, the interrogatory and the exclamatory. Some of these types are given sub-headings. Folstoe (1958) makes a fuller breakdown with twenty stages covering various aspects of language. The first six are pre-verbal and include crying and laughing. Stages 7 to 20 run from single words to complex sentences and take into account other developments as these tend to occur—the use of pronouns, adverbs and adjectives, etc. Other linguistic studies make functional categories, using various designations for these, while Piaget (1926) suggests a broad psychological division with egocentric and socialized forms of speech.

Illustrations of all these different aspects could be found in the speech of the group in question. It is particularly instructive, however, to see how the very non-verbal child manages. Peter (CA 10·0, IQ 28), a mongol, is of this sort. He has by contrast some manual dexterity and can, for example, bounce and aim a ball quite well. He is an only child, well managed (though over-fed) by devoted parents. Most of his utterances are of one-word type. Both Kolstoe's single-word categories, 7 (naming) and 8 (non-naming), are found; e.g. 'Chair', he says as he picks up a toy, or 'Throw', meaning 'I'll throw the ball for you to catch'. Kolstoe's categories 9 and 10, where words are combined, also occur; e.g. 'This one', many times used in various situations, and 'It bus', when discovering what a jigsaw makes. Category 11, 'the simple sentence understandable in its context', is also found but not the grammatically complete true sentence. Examples of the former show Peter approaching the latter, however;

e.g. 'Ball knock it down', 'Go, on a bus'. Other of Kolstoe's complexities such as adverbs are very rare, e.g. 'going high'. Exclamations are very frequently used and are perhaps his favourite means of communication, but they are barely verbal and are impossible to reproduce. Occasionally he asks questions; e.g. 'This it?', meaning 'Is this how to do it?', when joining up a toy train. He is not at all inclined to use the imperative and this is characteristic of his adaptable, always satisfied, outlook.

Emotional drives play a considerable part in the speech of many of the group. The lethargic in temperament produce little output, others suffer from 'press', or are erratic according to mood. The latter situation is seen in the case of Julie (CA 8·0, IQ 30) a non-mongol. She is pretty and wilful. At home, she has sensible parents and a bright little brother. At the Centre she is often stubborn and difficult, secluding herself. In the verbal situation her response is determined by her mood. Sometimes she will be mute or monosyllabic but (notwithstanding her measured low IQ which may be a function of her unco-operativeness) she is capable of speech examples which would almost qualify for Kolstoe's top category; e.g. 'You can't 'cos you go downstairs', 'I'll go and get cushions'. She also uses extended question forms and commands (to which she is addicted)—e.g. 'Who put water in this, you?' 'Are they your cards or mine?' 'Put your head right down!' But a striking characteristic of her conversational style is her tendency to echoing repetitions. Examples occur frequently, e.g. 'I'll put it there, I'll put it there.' 'The bus is going now, the bus is going.' 'Not so good there, not so good.' Such remarks come in sing-song tones. She uses all the pronouns and possessive adjectives but not time adjectives and adverbs to any extent. When not in a talking mood, there are as few as 10 responses per half hour. Sometimes she seems miserable on these occasions and breaks off the session abruptly, leaving the room with 'Going down now,' only to engage in solitary hand-washing in the lavatories when she does regain the classroom floor.

In Julie's case emotional disturbance inhibits conversation, but the opposite is true of Michael (CA 12 IQ 41). Though he is totally incompetent in a learning situation and responds poorly to intelligence testing, his manner is more that of the psychotic than the deficient. He is restless and at times almost hallucinated. His language, however, is at an acceptable level at its best, all Kolstoe's stages being represented. He rarely uses inadequate grammar and has an average sentence length of 4 words, which he often exceeds.

Fantasy dominates his conversation, fact and imagination blurring, as in the following series of communications, virtually a monologue. 'I heard it last night' (presumably on the radio), 'a man ran into a bus—he was dead—last night.' Now looking from the window, he sees a man approaching and some of the affect from the preceding is associated with him. 'Hey, look at that—a man, a man—poor man—he's poorly—what a shame for him—what a shame for him—it's a shame.' Some such conversations go on to describe operations and other trauma, all imaginary. They usually end inconclusively. In a more matter-of-fact mood, however, Michael is quite capable of explaining things clearly: 'Then you put a square like that and then you colour it.' His time sense also, more developed than that of any other in the group, leads to complex expressions, e.g. 'Oh, it'll be very dark when we go home today', or, 'After I finish school, I'll come over right away.'

CONCLUSION

Many points have emerged in the course of the preceding discussion. Some of these are established facts, others demand more research and exploration. In certain areas known norms assist in evaluating individual speech differences, elsewhere theories clash. As knowledge increases it will contribute to more certain diagnosis and more effective treatment. The final comment of this chapter must therefore be to underline the importance of an exact study of his speech in the educational guidance of the severely subnormal towards 'the goal of community integration'.

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3

Deafness and the mentally handicapped

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INTRODUCTION

Deafness and mental subnormality are conditions which have long been confused, as both may be associated with an imperfect or inadequate use of sound.

In the past, a severely deaf child without specialized help commonly developed little or no speech and came to rely on manual signs for communication. He was then described as dumb, an adjective also used in less conventional speech to indicate limited intelligence. Deaf children have not infrequently been mistakenly thought to be mentally retarded, particularly if they appeared to hear the sounds of speech without finding meaning in them, as may be the case with some forms of hearing loss.

On the other hand, the stony indifference to sound of some severely retarded and many autistic children has sometimes led to their being thought to be deaf, an opinion reinforced perhaps in the mind of a distraught parent as being the more acceptable of two monstrous alternatives.

The picture is further confused by the common occurrence of conditions which may be associated with both handicaps, as for example the cerebral palsies, German measles of pregnancy, and meningitis.

Further problems may also be experienced in distinguishing between deafness and mental retardation or immaturity in simple screening tests, for an abnormal response to sound due to a hearing loss is not necessarily distinct from an abnormal reaction which represents just one aspect of an all-round under-responsiveness to stimulation. In audiological practice, however, the two are only likely to provide diagnostic problems in very young children or where the picture is complicated by severe neurological or emotional disorder. The two conditions may coexist when, in addition to diagnostic confusion, the double handicap presents special educational problems and may lead to dilemma when it comes to school placement if the relative importance of each impediment is in doubt.

THE HANDICAP OF DEAFNESS

Every physical or mental impediment which interferes with normal progress, adaptation or adjustment presents a handicap whose magnitude varies according to the defect itself, the developmental state and constitution of the individual, and the personal and social pressures brought to bear on him.

The total handicap is the resultant of that arising from the primary problem and that due to the compensatory mechanisms consciously or unconsciously devized in an attempt to bring about adequate adjustment.

This adjustment may constitute an optimal balance between dependence and self-reliance, but is probably more frequently an unsatisfactory compromise measure brought about by the simple expedient of avoiding, withdrawing from, or ignoring situations which are associated with insecurity and anxiety. Preoccupation with tried and familiar things and repetition of stereotyped pieces of behaviour brings and maintains relief from anxiety at the expense of progress in learning and adaptation.

Too ready and too frequent acceptance of the proffered helping hand resulting in over-dependence on the indulgence of others is another route by which a handicapped child may seek to circumvent or postpone the task of dealing satisfactorily with his conflicts.

From this it may be seen that the emotional behaviour reaction to a serious disability can augment the handicap and indeed may often itself constitute the greater part of the impediment in the struggle towards independence.

Deafness is no different from other handicaps in this respect and a measure of obsessional behaviour or over-dependence on others, which may on occasion be excessive, is commonly associated with hearing defect in children.

Any handicap tends to interfere with social venture and facility, and the emotional reactions referred to greatly increase this embarrassment to normal socialization. Deafness, however, probably more than any other disability is likely to lead to social isolation of the individual.

The very young normally hearing baby, although most effectively in communication with his mother by touch, smell and vision, can from a very early age derive comfort from the sounds she makes even when out of sight. The blind baby, too, deprived as he is of sight of his mother, can nevertheless enjoy this long range contact which brings consolation for physical discomfort and offsets the anxiety and distress sometimes occasioned by her brief absences.

The deaf child, however, is not only robbed of the sound of his mother's voice, but may be violently, even unpleasantly, startled by her sudden appearance within his visual field.

It is not at present possible to compare this sensory or perceptual deprivation with that which might be associated with loss of tactual discrimination or postural sensibility, but the silent world of the profoundly deaf child seems so much more remote and even more terrible than the perpetual night of blindness.

Each of us in his imagination can sample to a small extent the condition of being blind, but rarely do we ever experience almost complete blank silence. This perhaps accounts for the popular lack of concern for the deaf shown by those not closely associated with hearing-impaired children and adults.

Few of us, however, realize how much use we continually make of our hearing quite apart from its use in speech. The deaf child in addition to being unconscious of much sound which those with normal hearing find enjoyable is further bereft of many clues that should aid localization or signal danger to him. The sounds of running water, of an approaching motor car or a warning cry fail to provide the information sometimes necessary to avoid disaster and he comes to depend almost exclusively on vision. One can easily imagine what terrors an unfamiliar environment might induce in a deafened person at night.

With this degree of isolation it is not surprising to find that deaf children, especially when not adequately helped during the early months and years, are often less social than their blind counterparts. This contrast is possibly more marked among children also handicapped by limited intelligence. Perhaps this situation obtains in part because blind children are usually more obviously handicapped, attract more sympathetic interest and are less liable to excite ridicule.

Interference with the normal development of language through speech may well impede the natural growth of certain aspects of intelligence and clearly narrows the scope of the main pathway to higher learning. Such a failure to develop speech and language normally does nothing to promote socialization and commonly augments the problem of social integration driving the older deaf person to seek companionship among others similarly afflicted.

Such a tendency, together with the frequent necessity to bring children with profound hearing losses together in special schools, leads to a much higher rate of marriage between young deaf persons than might otherwise occur, and this brings its own problems.

On the whole, the children of deaf parents are rather more likely to have hearing defects than those of hearing parents, but whether or not they are so affected, a satisfactory hearing environment may be difficult to provide for them, and it is not unknown for a normally hearing child of deaf parents to behave as if deaf and to fail to develop speech normally. It is sometimes difficult to convince parents, who have never themselves been able to efficiently exploit sound, of the extreme importance and urgency of early help and auditory training for their children.

On the other hand, most deaf parents are singularly awake to their own handicap and anxiously observe their children from an early age, seeking assistance as soon as hearing defect is suspected.

Finally, deafness in association with another handicap presents special problems for, although such associations are common, appropriate educational provision is still very limited and more usually the school a child must attend is selected on the basis of what is supposed to be his more important handicap and may in practice provide inadequately for this owing to the difficulties arising from the other disabilities.

HEARING AND DEAFNESS

Deafness implies a failure to respond normally to auditory stimulation, due to defect in hearing or the mechanism by means of which sound vibrations falling upon the ear are processed and raised to a level of neural organization that they may be brought into full consciousness by the process of paying attention or listening, or utilized adaptively at a subconscious level.

Deafness, or impairment of hearing, may result from structural or functional impairment at any level in the auditory system; it may be slight, moderate or profound, temporary or permanent.

Peripheral deafness, in which some components are filtered out from the sounds incident upon the ear leaving diminished and distorted sensation, is commonly differentiated from impairment of the ability to discriminate, recognize, or otherwise fully exploit the signals reaching the higher levels of auditory function. The latter disturbance, which is often referred to as 'central' deafness, may result at one extreme in a failure to respond regularly to sound at all when little or no meaning is recognized in it, or at the other extreme to difficulty in deriving the full meaning from complex speech sounds or in developing normal understanding for speech.

In addition to true hearing impairment, there are other possible reasons why a child should not respond to sound in a normal manner.

Variation in the state of consciousness, awareness or attention, as is seen in some forms of epilepsy and malfunction of the brain, will produce considerable variability of response to auditory stimulation and in the use made of sound.

The extremely remote or withdrawn attitudes and obsessional behaviour seen in certain children and often termed autistic are frequently accompanied by an absence of obvious response to sound, or negative reaction to auditory stimulation.

Blindness, weakness of bodily movement or postural disability, expecially when complicated by secondary handicap, commonly induces abnormalities in the development of response to sounds or confusion in the localization of their sources.

Finally, mental subnormality or general immaturity may be accompanied by immature reactions, negative behaviour or lack of clear-cut response to sounds. This situation is most commonly met with in children during the early years and is seen less frequently in older retarded children except among the severely emotionally disturbed.

HEARING FOR SPEECH

Speech, our normal and most effective means of communication, is entirely dependent upon efficient hearing, though other senses also play important roles in its development and use. Vibrations in the air set up by the articulatory organs of one speaker are detected by the ear of the listener where a primary analysis of the speech sounds takes place before the message is sent, as a pattern of nerve impulses, along the acoustic nerve to the brain for further processing.

Before a child can develop expressive speech, he must have experience in hearing and attending to the speech of others; to do this he normally makes efficient use of hearing throughout a frequency range of about 100 to 8,000 cycles per second (cps), the so-called speech range of frequencies.

The frequencies and intensities of sound vibrations which largely determine the subjective sensations of pitch and quality require a complete hearing mechanism for their efficient and proper discrimination.

The sensitivity of the ear to intensity, which is subjectively interpreted as loudness, varies with the frequency of the sound but there is a level, known as the threshold of hearing, for any particular ear at which a listener becomes just aware of any particular sound frequency. If this threshold intensity is increased about a million million times, a sensation of discomfort or pain is usually experienced by a normal person.

Spoken utterances consist of complex sequences of sounds, each of which is made up of a collection of different frequencies, the most important of which, however, tend to correspond to certain restricted ranges of the frequency scale of hearing.

Thus the vowel sounds tend to have their most important components for normally hearing folk in the lower frequency band, 250 to 2,000 cps. Those of the consonants (*m*, *n*, *ng*, *l*) tend to be found in the middle ranges, whilst the fricative sounds (*s*, *th*) and the plosive sound (*t*) are very high frequency sounds. The remaining consonants tend to spread their energies throughout various regions of the frequency spectrum.

On the whole, the vowel sounds are the most energetic, having the greatest carrying power and embodying much of the emotional character of speech, whilst the energetically much weaker consonants carry most of the information characteristics upon which discrimination or selection normally depends.

The spoken word '*thaw*', for example, consists of two elementary speech sounds and represents a contrast between the most powerful sound in the English language and the weakest. When uttered at conversational level the intensity of the '*aw*' vowel sound three feet from the speaker is approximately one thousand times that of the unvoiced '*th*', sound. The weaker sound, however, is all that distinguishes '*thaw*' from '*saw*', or '*law*', or '*paw*', etc.*

If the hearing is defective in the high frequency range, the comparatively weak consonantal sounds will not be heard properly and ordinary speech will be blurred, rather as one hears sounds coming from behind a closed door. It may be possible to recognize the mood of the speaker as angry, amused, hysterical or penitent, but very little of the speech will be understood, for the high frequencies have been filtered out from the sounds by absorption during their passage through the door.

It is possible, by using tuned electrical circuits, to filter out from speech sounds most of the energy in any selected range or band of frequencies, and in this way, by listening to the mutilated sounds as played through headphones or a loudspeaker, simulate and gain some insight into the difficulties experienced by an adult who loses his hearing. Using such filters it is found that the intelligibility of speech from which the higher frequency components have been eliminated varies according to the range of frequencies still remaining. With recorded isolated words there is little difficulty with discrimination when all components under 2,000 cps are present.

Further loss of high pitched components now steadily makes discrimination more difficult until most speech is likely to be incomprehensible when only sounds below 800 cps are heard. A low frequency pass filter cutting off components above 1,500 cps, as illustrated by the audiogram representing a perceptive hearing loss (Fig 3.4), would probably result in the ability to recognize less than 60 per cent of isolated words without the aid of other clues. However, connected meaningful speech is usually intelligible under these conditions.

Normally under poor listening conditions we make considerable use of information gained by watching the face and lips of a speaker, a facility which is developed to a high degree of efficiency by those with permanent hearing losses.

It will be appreciated that the situation for a child who has never known normal hearing will be quite different, for his interest in sound and speech will vary with experience, and the sounds from which he derives his information have always been received through faulty ears and are not for him distorted. Such a child may make more use of information contained by the lower frequency sounds than is usually done by the normally hearing child.

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* In fact, the consonant imposes changes upon the segment of vowel immediately following it which, under certain conditions at least, allows the presence of the consonant to be recognized by the listener even when it is not actually heard.

VARIETIES OF DEAFNESS

Any process or disease which tends to prevent sound reaching the sensitive inner ear leads to what is called a conductive deafness. Accumulation of hard wax in the ear of an adult, perforation of the ear 'drum head', infections or deformities of the outer and middle ear or back of the nose may produce this kind of condition.

Such a loss, which is potentially remediable by medical or surgical measures, is usually of slight to moderate degree, roughly equal at all frequencies and largely obviated if sounds are made to bypass the middle ear as by bone conduction (see Fig 3.2).

Defect of the inner ear mechanism or the acoustic nerve results in failure to detect the sounds which reach it or to transmit the appropriate patterns of nerve impulses to the brain. This kind of loss, which is referred to as a perceptive loss, may be present at birth or caused subsequently by injury or disease.

The form and degree of a perceptive hearing loss depends on the cause and on the region of the inner ear most affected. Perceptive deafnesses are characteristically more severe in the high frequency range and are not usually susceptible to medical treatment (see Fig. 3.3).

Either kind of deafness may affect one or both sides.

A moderate degree of hearing loss may be overcome by raising the intensity of the sounds, but a conductive deafness may vary considerably even over short periods of time and is often asymmetric. This may lead to great confusion for the child who can hear well enough on some occasions but not at other times. The consequent variability of response to sound may be wrongly interpreted by a parent or teacher and the combination of primary confusion due to the deafness and the apparently inconsistent attitudes of grown-ups can readily lead to emotional disturbance.

A moderate to moderately severe hearing loss may be compensated for almost unknowingly by a child in a good home environment by his making full use of what speech sounds he does hear together with information gained from watching the faces of the speakers and from other situational clues.

However, a child who hears the low frequency components of speech but little or nothing in the high frequency range may respond to the sound of speech yet be unable to obtain much information from it. At one time such a child with quite normal intelligence

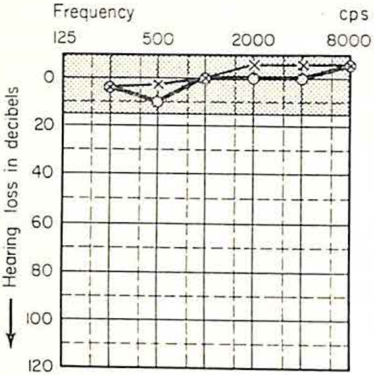

Fig. 3.1 Normal pure tone audiogram.

O Right ear
× Left ear
□ Bone conduction

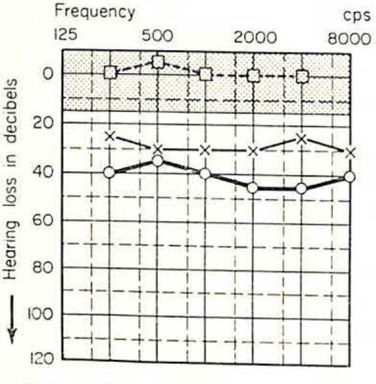

Fig. 3.2. Bilateral asymmetric conductive loss. Normal sensitivity of the inner ear indicated by the bone conduction curve.

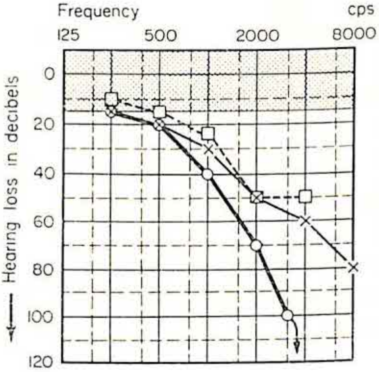

Fig. 3.3 Bilateral perceptive loss. The bone conduction curve follows the better ear.

On these pure tone audiograms the shaded portion represents the normal range of hearing for young healthy persons. The hearing loss of a particular individual is represented by the amount a particular frequency must be amplified to be just heard and this quantity is recorded as a downward displacement on the audiogram in decibels. The very great range of sound intensities perceptible by the normally hearing person makes the quantities unwieldy to handle in practice. A logarithmic system, the decibel scale, has been adopted as a notation for recording and manipulating intensities. On this scale, for example, the addition of ten decibels (+10dB) increases the intensity by times ten (×10), or +20dB by ×100, whilst the subtraction of 10 bB (−10 dB) diminishes the quantity to one-tenth (1/10) or −20 dB to 1/100th of its value.

stood a very real risk of being thought stupid or even of being considered mentally severely subnormal (Hilliard and Kirman, 1957).

A severe or profound deafness from birth means an almost complete unfamiliarity with meaningful sound until these sounds are sufficiently amplified by some means. In consequence a child with such a loss often appears to be unaware even of the existence of the sense of hearing. In these cases, even when the sounds are amplified so that the child can hear them, it is necessary to arouse and foster interest in sound and train him to attend to and find meaning in auditory signals.

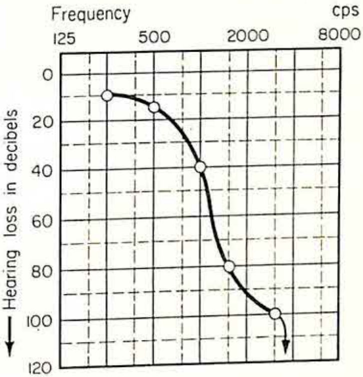

Fig. 3.4 A diagram showing the effects of listening to pure tones through an artificial sound filter which eliminates most of the sound of frequencies above 1,000 cps. It will be seen that the diagram could equally well illustrate a high frequency hearing loss.

RECOGNITION OF HEARING DEFECT

Deafness may be suspected by an observant parent during the first year if a child fails to respond to loud sounds or if his vocalizations diminish towards the end of the year. On the other hand, hearing defect is often considered only when a child's expressive speech fails to develop as early as expected or remains distorted and unintelligible.

Less often, rather surprisingly, a child's inability to understand what is said to him leads to suspicion of deafness or mental retardation and his consequent referral for assessment.

However, parents are sometimes told that such a child is a late starter and that they are worrying for no reason. The important difference between a child who is simply not speaking at 2 years and one who is unable to understand speech at this age is often overlooked, and a child is sometimes not recognized as being deaf until as late as 3 years of age or even older.

Fairly frequently aching or discharging ears may bring a child to the notice of an ear specialist but, on the whole, whether or not a deaf child is identified early is little more than a matter of chance, and a proportion of deaf children are still overlooked until a tragically late age.

To overcome this deplorably inefficient situation where casual observation is depended upon for the recognition of hearing impairment in children, two schemes have been devized and both methods are being used successfully in certain regions of Britain. One involves keeping a 'risk register' of children who, by reason of loaded family history, disorders of pregnancy or exposure to various hazards during birth or the period immediately following it, are considered to run a higher than average risk of developing abnormally.

These children are followed up by observation and testing until the presence of any abnormality can be fully defined or ruled out completely. Unfortunately, even when an efficient risk register is maintained, a large proportion of hearing impaired children do not appear on it.

The more satisfactory alternative, which however is best implemented in addition to risk register follow-up, is the systematic screening of all children for hearing impairment preferably during the second half of the first year of life and again before commencing school.

Screening the general child population, employing health visitors to do this, is being adopted more and more widely by local authorities and is proving very successful, where adequately carried out, in leading to early recognition and treatment.

The child population should, of course, be screened for all abnormalities but even now the simple techniques advocated by the Department of Audiology at Manchester University, and intended primarily to discover unsuspected hearing loss, is capable of picking up large numbers of children with serious cerebral dysfunction including a high proportion of mental backwardness. Such a screening technique could be readily modified to include, for example, simple tests of visual perception and hand-eye co-ordination.

TECHNIQUES OF TESTING

The object of hearing tests is to determine the nature and degree of any hearing loss and, in particular, to assess the ability of an individual to hear and discriminate the essential sounds of speech.

When a child is unable to comprehend sufficient speech, an attempt is made to have him respond in a clear-cut fashion to a number of test sounds selected in order to sample the various regions of the 'speech range' of frequencies.

With small children these tests are conducted 'in free field' or without the use of electrical apparatus as opposed to the 'closed circuit' methods involving head telephones, tape recorders, etc., which are so useful with older children and adults.

A series of techniques for testing the hearing of children has been developed over a period of years at the University of Manchester and has proved very successful (Taylor, 1964). These techniques for testing young children have also been developed into screening tests suitable for use by health visitors and others to filter out from the general population the children showing abnormal responses to sound (Ewing, 1957).

As the screening techniques also represent the skeleton structure of the much more elaborate tests carried out to assess hearing loss or to distinguish it from the other causes of abnormal response, it will be most profitable to describe these briefly.

A child is not normally tested until he is able to sit with at most minimal support and turn his head to either side to localize stimuli. This is normally at about 6 months of age.

With a child between 6 and 18 months of age, the testing consists of having him turn from a distracting stimulus immediately in front of him to the test sound generated at or below a certain maximum intensity at a distance of about 3 feet just behind the field of vision and on a level with his ear. An acceptable response is an immediate turn with localization of the source of the signal.

The basic sounds used in this test are the speaking or singing voice, another low frequency sound (as for example a reiterated '*oo-oo-oo*' sound), a rhythmically produced '*s*' sound, and the sound of a special rattle which when correctly manipulated produces sound with no appreciable frequency components below 4,000 cps. For a child's performance to be considered normal he must respond to all four sounds on both sides.

Normally a child of 18 months or over has a considerable understanding of simple speech and is at least able to respond to a number of key words. Hence from this age onwards discrimination and comprehension of speech is employed in the testing.

Such tests, called co-operative tests, consist in establishing rapport with the child and having him respond in an unequivocal way to several simple injunctions or questions delivered at about 3 feet from either ear below a certain maximum intensity and without environmental cues. The high frequencies are checked by distraction as described above and binaural hearing is briefly checked by having the child localize normally loud sounds coming from various directions.

From 2½ to 3 years a normal child can usually be quickly taught to respond to a test sound in an unequivocal manner, as by dropping a bead into a box or by tapping on a drum. When the conditioning is well established the test sounds, usually '*go*' and '*s*', are reduced to the required intenstities for testing and delivered at the appropriate distances from either side. This performance test is supplemented by tests of localization and speech discrimination.

In all these tests, the test sounds made are of intensity levels considered to be very quiet by normally hearing persons.

In the diagnostic clinic elaborations of these three tests are employed using a greater variety of sounds and, where necessary, raising and recording intensity levels until responses are obtained.

With children of about 3½ years and over it is often possible to extend the third or 'performance' technique to 'closed circuit' and have the child respond to pure tones generated by an audiometer and delivered through headphones.

DIFFERENTIAL DIAGNOSIS

At the diagnostic clinic, in addition to recording the level at which a child responds to a sound, a history of his development is obtained and observations are made on the quality of his responses and the nature of his general behaviour and demeanour.

An otological examination is made and when necessary neurological and psychological assessments are carried out. Biochemical and other investigations are arranged when appropriate and referrals to other specialists decided upon.

If there is doubt as to whether an apparently profoundly deaf child is really hearing sound, a technique called electroencephalographic (EEG) audiometry may be used. This consists in picking up and amplifying the minute electrical potentials which filter through from the brain to the surface of the scalp and displaying them as wavy line graphs on moving paper. Under good conditions when the child is in a state of light sleep, sounds reaching the ear and stimulating the brain evoke transient alerting potentials at the cortex of the brain which are picked up by the electrodes and appear on the EEG record. In this way test sounds at various intensities may be impressed and an audiogram or diagram of the hearing ability built up.

Subnormal children will usually have a history of slow development, will often show immature responses to sounds and other stimulation and may also exhibit constellations of signs commonly associated with mental subnormality.

Immaturity and immature-like responses may, however, be seen in children who have suffered damage to the brain or have been emotionally or sensorially deprived but are not mentally retarded. In these cases there are often signs of neurological impairment and emotional disturbance.

The so-called autistic children and some of those with 'central deafness' often appear to experienced workers to be 'too deaf to be deaf' and can usually, after considerable difficulty and employing complicated manoeuvres, be demonstrated to have hearing for sounds of low intensity.

Sometimes the state of hearing is assessed very quickly in a matter of minutes but not infrequently repeated observation and testing over a period of weeks or even months, together with various ancillary examinations, is required to define the condition accurately.

MANAGEMENT AND TREATMENT

From the moment that a significant degree of hearing loss is diagnosed every effort must be made to improve the child's hearing, listening and interest in sound, especially speech.

Immediately following the tests the parents are acquainted with the results and an attempt is made at explanation and, when possible, some discussion of the child's probable future progress. From this time onward the parents will need and must have sympathetic support from all those having to do with their child's welfare.

Medical treatment is instituted when and where necessary and a hearing aid recommended if indicated.

The parents are reminded of their pre-eminent role in helping their child to overcome his disability and are given some simple instruction in ways of fostering an interest in sound and promoting speech. In suitable cases and where facilities are available, arrangements are made for the parents to have regular special instruction and demonstration of how best to manage the deaf child's problems in his own home. Auditory training needs to be intensive and continuous and is therefore normally carried out by the parents at home.

The primary object is to help the child to discover meaning in sound and to associate meaningful sound with the information he gains through the other senses. It is therefore necessary that the sounds used be made meaningful.

A child may be encouraged to play with noise-producing objects but most important of all he needs to hear speech. Not single words chanted at him over and over again but connected speech representing real language with perhaps certain key words accentuated in various ways.

If a deaf child is to benefit from hearing speech there should be co-ordination between the sound of a speaker's voice, the image of his facial movements and the various sensory impressions of the object or situation being talked about. Hence the first essential with a very young child is to get and keep his attention, and only when this is achieved is progress likely to be made in auditory training for speech.

Speech is, of course, primarily a two-way means of communication and it should be treated as such from the beginning. A child needs not only to hear the voices of other speakers, he must also hear his own voice if he is to receive and understand speech, and to talk himself.

With this aim in view the child is introduced as soon as possible to the speech training amplifier which is equipped with two microphones, one of which is for his own use, the other for his parent or teacher.

The general principles of auditory training, although here devised to help children with peripheral hearing loss is, with modifications, also applicable to other conditions in which a child is not making full use of his auditory or other sensory modalities as in mental subnormality, central deafness, locomotor disorders and defects of vision.

As the handicapped child gets older, or when he is diagnosed late, the question of further and more formal education is carefully considered. When necessary it may be recommended that a child be admitted to a school for the deaf, or a school or unit for the partially hearing or sometimes to an ordinary school where a specialist teacher or a peripatetic teacher of the deaf visits regularly.

In these ways an attempt is made to overcome or compensate for the physical impediment and to meet the emotional difficulties of the child and his family.

FUTURE DEVELOPMENTS

As we learn more about the physiological and psychological processes of hearing and the pathology of and emotional reactions to hearing impairment, it is to be hoped that we can find ways of reducing the numbers of children affected in this way and of more effectively helping those who are so afflicted. We must improve our methods of detection and diagnosis of hearing loss, and adopt and develop modern educational methods to help overcome or compensate for the handicap.

Already diagnostic methods are differentiating a wider variety of conditions from what were previously thought to be homogenous groups of deaf children. EEG audiometry is being developed in conjunction with a special computer to provide more objective measures of response to sound, particularly in the waking state. Advances in electronics are rapidly making possible smaller and more versatile hearing aids, while surgical techniques to relieve certain kinds of conductive hearing loss have become astonishingly sophisticated and successful.

Finally, the rapidly widening interest and research into educational psychology and teaching techniques in the general and specialized fields of education is producing a wealth of information and ideas crying out to be exploited by practicing teachers. Surely much of this will be applicable to the education of the deaf and the mentally subnormal.

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The learning difficulties of subnormal children

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SOME GENERAL CONSIDERATIONS

It is increasingly common nowadays to refer to subnormal children as slow learners; indeed, the Plowden Committee has recently suggested that ESN children should, in future, officially be called slow learning children. This term may well become popular for the severely subnormal also; perhaps they will become known as very slow learners. The advantages of the change are obvious. First, the new term has a less unpleasant ring; it has a much more normal sound. Second, it emphasizes a more positive way of looking at the subnormal, suggesting that even if they may be slow, they can in fact learn.

On the other hand, we must beware of typing children. Some may be slow in the sense that they cannot think or perform at the same speed as ordinary children, others may need to be shown, or to practise, a new skill many many times before they master it; yet others may not be slow learners at all. This last group may, for example, have long periods when they are not learning at all, and then have a short spell of normal progress and so on.

Ever since the time of Binet, one of the psychologist's main interests in studying the subnormal child has been to explore the ways in which his development differs, both intellectually and emotionally, from that of normal children. When we assess the mental age of a subnormal child, we are finding out what level of development his intellectual skills have reached. Thus we might say that a 9-year-old subnormal child has a mental age of 5, meaning that his intellectual level is similar to that of a normal 5-year-old. But this does not mean that he should be treated like a 5-year-old or that he has 5-year-old interests, or even that his capacity for learning is exactly the same as that of a 5-year-old. As Binet himself suggested, we want to find out what subnormal children are like, irrespective of their age; the more we succeed in this the more we can do to help.

In this chapter, then, we shall discuss how subnormal children function differently from normal ones, as well as some of the ways in which we can help them. However, two general cautions are necessary. First, it must be remembered that there are many causes of subnormality and many types of handicap; so that although one of the main purposes of scientific study is to find general rules, no rule can apply to *every* child: some procedures will work with one child and fail with another. Second, there has been a great deal of research in the last few years into the intellectual powers of subnormal children, but the amount we know for certain is still very small. So in classroom practice we have to combine the best of modern educational methods (many of them taken from infant school work), whether fully tested by research or not, with what is suggested by systematic investigations carried out on subnormal children.

THE CHILD IN THE LEARNING SITUATION

One way of appreciating the problems of the subnormal child is to consider what kinds of learning opportunities he receives, how he reacts to them, and what benefit he gets. In each case this can be contrasted with the experiences and reactions of the normal child. Later on in the chapter some additional difficulties of the subnormal will be discussed separately.

When a normal child is put into a strange or new situation he shows a number of positive reactions. He is well motivated; that is, he wants to learn new things and he is willing to make an effort to understand them. He does not have to be bullied or threatened; he seems to have a built-in desire to learn. He is involved, too; he sees success as affecting him and his own importance. As he masters a skill or learns about a situation, he becomes in his own eyes a more adult and more important person. He is curious, too; he wants to know why, what for, how, when. He wants to imagine himself in the other person's place—working out what it is like to be a doctor, an engine driver, a nurse—or just a grown-up.

Most subnormal children react quite differently. The new situation or experience may make little impact on such a child. He may shrink away from it, but more often he will behave as though it were not there. When his attention is drawn to a task, he may show little keenness and need much persuasion to stay at it for any length of time. He soon gives up or goes off to another activity. He asks few questions and indulges in little role-playing. He is not curious and tends to accept things as they are without enquiry. He seems to have less sense of himself as a person and little identification with adult roles. In the actual learning situation he frequently shows one of two reactions. Either he flits from one activity to another, showing extreme distractibility, restlessness and hyperactivity, or he settles down to a monotonous, repetitive routine in which he performs a task over and over, but shows little obvious interest or understanding.

Such behaviour on the part of the subnormal has often been referred to, particularly by the Gestalt psychologist Kounin (1943), as behavioural rigidity. The subnormal child, according to this theory, has reduced ability to change his activities for himself and sees little connection between similar activities. If he is asked to draw cats for a time and then switch to drawing rabbits, he will see the second activity as new and quite different from the first one and go on with it long after the normal child has had enough of that kind of drawing. Being passive in his learning he will not see relationships for himself, nor will he make any spontaneous use of the knowledge he has, when confronted by a new situation.

However, this concept of rigidity has been questioned by later experimenters. It has been suggested that most of the characteristics just described may not be inherent qualities of the subnormal, but rather the result of the restricting environment in which many subnormal children have been brought up, particularly in institutions. They have often received little attention and stimulation, have been drilled into quietness and submission, and early signs of spontaneity and curiosity may have been mistaken by overworked nurses and parents for awkwardness and oddity, and firmly discouraged. So the rigid behaviour and passivity, although partly due to the child's condition, may have been positively fostered by his upbringing.

Werner (1946), who is one critic of the rigidity hypothesis, has suggested that many subnormal children are exhibiting 'catastrophic' reactions, possibly to stressful experiences. The child may react in two ways, both of which are essentially ways of avoiding the demands made of him. He may either become withdrawn and passive, doing only simple routine tasks whose very monotony acts as a kind of protection from the outside world, or he may engage apparently eagerly in a whole series of activities; in fact, on careful observation, it becomes apparent that he avoids involvement in any of them—before he has properly started one activity he is off to the next.

Furthermore, those who have come to work with the subnormal with fewer preconceptions have found that, given encouragement, they soon begin to show many more normal characteristics, indulging in creative and imaginative play, and showing much better application and interest if they are encouraged to choose activities which are meaningful to them, rather than those which the parent or teacher has expected to be appropriate.

The next aspect for us to consider is the social relationship between the child and his parents, other children, his teacher and everyone else he meets. The normal child is given constant social reinforcement. As a baby he finds himself continually the centre of attention; people gather round him, attempt to stimulate him and make constant admiring and appreciative remarks. When the baby smiles, everyone is delighted and they smile back at him. When he coos and makes noises, they 'talk' back at him. As he learns about the habits and the language of those about him, his attempts to imitate them are encouraged and enjoyed. His mistakes, too, are often a source of enjoyment. When the baby says 'I bringed it' or 'mans' he is, of course, showing good language development—he has learned how to form the past tense and how to make words plural and proves this by his mistakes with irregular words.

This social reinforcement in early life sets a pattern of confidence and ease which is all-important in the child's continued development. He learns that other people value him, that they are willing to help and give encouragement, and that even if he is laughed at for his mistakes he is helped and put right. This is not just a one-way process: the child himself reinforces the reactions of his parents and of everyone else. Just as the adult's stimulation produces the baby's smile, so in turn the baby's smile encourages the adult's interest. In fact, it is not always clear which comes first.

Much of this social interaction and reinforcement could in theory be just as successful with the subnormal child, but in practice the process often goes wrong. Once the child is known to be subnormal, many people, particularly those outside the immediate family circle, become embarrassed by him. Not many are positively hostile, though there are always a few people (often with unsolved personal problems of their own) who show real ill-will, claiming perhaps that the subnormal child will infect their own children. More commonly, there is so much uncertainty in people's minds—should they pretend there is nothing wrong, commiserate with the mother, be specially attentive and encouraging—that they take the easiest way out by ignoring the child and often the mother also.

Those who do attempt to treat the child normally often become discouraged. The subnormal child needs and responds to the same kind of stimulation as any other child, but he needs much more stimulation before the response is forthcoming, and he is often not able to make the response at all until he is much older. As a result, people often become discouraged and stop taking an interest in and helping the child. For, unlike the normal child, he fails to encourage and reward the adult by making the expected response. This situation can easily become a vicious circle. The child shows little response; other people, therefore, fail to bother with him; he therefore has even less inducement to make progress. His feelings of personal significance are given less chance to develop and the child may grow up with much less feeling of belonging and being involved with other people.

Another important aspect of development is the learning evironment in which the child lives. As we are aware nowadays, normal children may come from a wide range of backgrounds, varying from families where there is rich provision of language, play materials and opportunities for the development of physical skills, down to those where there is almost complete impoverishment. Nevertheless, the normal child in almost all families has unlimited opportunity for learning. He listens to adult conversation, watches and takes part in adult activities—baking, cooking, decorating, washing the car and so on. He goes to the shops, the garage, the park, the zoo and seaside. All these experiences provide the child with knowledge of the world and of personal relationships and afford him endless occasions for enlarging and deepening his vocabulary. Out of all these experiences, together with the child's maturation, comes growth in understanding, the development of intelligence and social maturity.

In this informal education there is little problem of selecting the right experiences for the age and stage of the child. This is achieved quite naturally in two ways. First, there are strong social conventions, usually unexpressed, but mostly quite sensible, about what the child should and should not do, and what experiences are suitable for him. Provided that these limits are not enforced too rigidly by his parents, they are usually wide enough to give the child a very full range of opportunities. More important perhaps, is the child's own ability to monitor or 'filter' his own experiences. He is expert at extracting what he can use and ignoring the rest, or storing it up as background for future learning. Suppose a mother is reading a story aloud to three children of different ages. The oldest child may be following every nuance and subtlety of the relationships, characterization and sequence of events in the story. The next child may only be getting a general idea of the plot, but may be learning new words and improving his ear for language at the same time. The third child may only be learning that books say things, that people listen attentively to what they say, that you have to look carefully at the black marks on the page and that every so often you turn over. But the learning is multi-level. The child who is at a lower stage will often gain a little inkling of a skill which is at present beyond him. Thus, in our example, the middle child may catch the occasional subtlety and the younger child may sometimes grasp more of the story than we realize. These early anticipations of skills still to be acquired are of special value; for they mean that the more advanced skill will be approached with some familiarity and relevant background, not as something completely new and foreign to the child.

We can quite happily trust the child to select his own experiences in this way, taking what he can use and ignoring (or apparently ignoring) the rest. It is only in formal education that we must beware of giving experiences too early and possibly discouraging or confusing the child. Similarly, with goals. If the child is setting his own goals, both immediate and long term, we need, in a healthy environment, have few worries as to their appropriateness. It is only when we are setting them for him that mistakes are likely to occur.

The subnormal child misses nearly all of this informal education for reasons which are both intrinsic and extrinsic. Very often, as we have already implied, he lacks the spontaneity and curiosity of the normal child; so he pays much less attention to events and conversations which are not specifically aimed at him. Consequently, when he comes to learn something new he has no background of previous half-understood experiences to draw upon. As Bruner (1966) has suggested, he has to learn far more things 'de novo'—from scratch. Very often he suffers extrinsically, too. Experiences are not provided for him, or he is excluded from them. There are a number of reasons for this and they are worth looking at in some detail.

If the child shows little response when it is expected of him—say, not talking at quite a late stage—then special efforts may often be made, particularly by the mother, to talk to him and to try to help his development. But if, after a long period, there is still no obvious response, she may well be discouraged and slacken her efforts or even give up. The child is then largely ignored and excluded from conversation. If he cannot run errands, either through physical handicap or lack of understanding, he will not even learn, as many children do, through commands ('Put the bread on the table', 'Go and answer the door'). So just at the stage when a very handicapped child might be ready to benefit from conversation, people may have stopped talking to him.

Another difficulty arises in that the subnormal child is often trying to learn a skill at what is socially the wrong age, and, moreover, spending longer over it. Parents may not mind a 2-year-old toddler who follows them around getting into constant mischief and who always wants to imitate their actions. But a 6-year-old toddler is much less acceptable. For one thing he is bigger and stronger and therefore more destructive. For another, he goes on being a toddler for so long as to wear out all but the most patient of mothers. It is, of course, also socially shameful to have a child who does the wrong things for his age, and so parents may start avoiding 'public occasions' with the child who might embarrass them on the bus, in the shops, or at the restaurant.

Hostile attitudes toward the child may further deprive him of valuable experiences. The parents' stability and patience are under special pressure. Not many of them can avoid some feeling of guilt (although quite unjustified) at having produced an incomplete child, and the extra work and worry entailed may make them resentful and rejecting towards the child. These feelings are not always openly expressed or even consciously felt; in fact, they rarely are. But they may play a subtle role in the child's upbringing. For instance, the mother may try to make up to the child for his handicap by specially comforting, cosseting and protecting him. If this is done to excess (and it easily can be) the child may well-meaningly be over-protected—deprived of experiences (and frustrations) which would be good for him.

Finally, the education of the subnormal child is particularly difficult for the normal mother—or indeed teacher—because they may not have the insight or the professional advice needed for helping these children with their special difficulties. Frequently they do not realize where the child is failing and how he might best be helped in some particular circumstance. Very often, he needs to have goals clarified for him—to understand the purpose and the long-term aim of a particular activity. Otherwise, his learning may be very narrow and motivation poor. Without help also, well-meaning adults may spend many hours 'teaching' the child a skill for which he has no appropriate background, as when children with no reading skills are encouraged to write out pages of letters, instead of, say, developing vocabulary by discussing pictures.

SOME SPECIAL DIFFICULTIES

So far we have been considering the subnormal child's problems by contrasting his position with that of normal children. The subnormal child often has extra difficulties, some of which arise out of the factors we have been considering, while others may result from damage to the central nervous system, or from other causes which we do not yet fully understand.

One special difficulty has been emphasized by the French psychologist, Zazzo (1960). As the subnormal are slow to make progress in learning, they often spend much longer at a particular stage than a normal child. The result is that they may become very firmly established in responses which, though suitable at one stage of development, need unlearning at the next stage. They are therefore worse off than the normal child who never learnt the first response as thoroughly. In learning a skill, for example, slow deliberate movements may be needed at first; later these may have to be integrated into a flowing sequence. If the separate movements are learnt too thoroughly it may be much more difficult to bring them together. Similarly, in learning to read too much slow piecing together of words can obstruct later rapid silent reading.

The subnormal child's lack of spontaneity can add to his difficulties in transferring learning from one situation to another. Psychologists such as A. D. B. Clarke are coming more and more to regard transfer as a cardinal factor in learning. That is, they are stressing how much of our learning is not new, but results from the application or reorganization of already acquired knowledge and skills in solving new tasks or acquiring fresh concepts. Subnormal children do not lack the capacity for transfer but they may often fail to use it unless their learning is broad-based and carefully organized. Frequent practice at simple tasks does not necessarily assist in this; it may even be a disadvantage, perhaps for the reason given by Zazzo (1960). Many studies have also shown that the subnormal are not only limited in vocabulary and language skills, as one might expect from their low mental age, but that they do not make full use of the skills they do have. When subnormal people are interviewed and questioned they may converse fairly well and be quite good at defining words. But in their day-to-day lives at work and play they may use much more restricted language, although, as we have already suggested, in encouraging situations they are quite capable of imaginative and creative behaviour.

Another problem which has attracted the attention of research workers is that of cross-modal or intersensory skills. As human beings develop they learn not only to make judgements within one modality—say, in vision, comparing one picture with another—they also learn to translate information from one modality to another. Thus, when a child is shown a shape which previously he has only handled behind a screen he can decide whether it is the same one or not. These skills are made possible by the child's ability to 'code' or to 'represent' to himself the object he has felt or seen and then to transfer the representation to another modality. Usually, it is thought, he does this by verbal mediation—using his ability to describe objects in words. The subnormal child seems capable of cross-modal learning but, in line with what we have already noted, he is likely to need help or encouragement on the verbal side or he will not perform really well.

O'Connor (1966) suggests that most recent studies of the subnormal point especially to their having an attention or input deficit. When confronted with a task, their main difficulty is in realizing what is required of them and in singling out what aspects of the situation have to be attended to and how. This deficit seems to be related to poor short-term memory—a special weakness of immediate recall, although long-term memory may be relatively good (the difference between, say, repeating a telephone number and remembering a learned skill). The educational implications of this difficulty are obvious and we shall return to them later.

THE POSITIVE SIDE

In the next section we shall be looking at ways in which subnormal children may be helped socially and educationally. However, before doing this it may be well to note that these children have many positive assets and are not handicapped in every direction.

Research has shown that in many respects the subnormal can work at tasks as successfully, or very nearly so, as normal people. When learning a new skill they may start at a much poorer level, but if sufficient practice is allowed (and a great deal is sometimes needed) they eventually attain—and maintain—good levels. Their memory for anything once learned is normal, and they can make successful workers, particularly since many of them are very nearly normal physically.

There are practically no human abilities which the subnormal lack completely. Their best level intellectually is obviously below that of the normal, and they do not therefore achieve highly complex skills; but the structure of their learning shows a fairly normal pattern. When they have language they can use it meaningfully, perception is often adequate and transfer abilities are good. We cannot pretend, even with the best educational provision, to make subnormal children into completely normal adults, but we should certainly be able to set them some way along the road, finding ways to reduce some of their disabilities and to circumvent others.

EDUCATING THE SUBNORMAL CHILD

Many of the issues already discussed in this chapter contain implicit suggestions for educational practice. It is not intended, therefore, to work out each of these in turn in this section. Instead, five or six of the most important aspects which need special emphasis or elaboration will be outlined.

No learning can take place unless there is an adequate basis for it in previous experience. The work of Piaget and of many sociologists as well as psychologists makes this quite clear. It is of prime importance, therefore, to provide the child with a wealth of experiences: sensory stimuli of all kinds, movement and physical experience, as well as the indirect knowledge acquired through books and pictures. Language, too, is crucial. Much of this necessary experience is best acquired incidentally in its natural setting. The child should learn about food in the kitchen, not the classroom, and about plants and trees in the park, not indoors. This is particularly so for young children for whom experiences need to be live and concrete. It is only later on, and perhaps particularly with bright children, that we can afford to take short cuts by letting them get their knowledge mainly from books. Indeed, many modern educators are coming back to the ideas of men like Rousseau who thought book-learning at any stage a poor substitute for direct knowledge.

Once we are sure that the child is enjoying a rich and stimulating background we can start to think more directly of teaching him. Before beginning, however, we must be sure that the starting point is right: this can best be achieved by careful study of the child, especially in informal situations. Normal children differ widely in their interests and capacities and this is even more true of the subnormal, so the teacher who is anxious to get down to work with the child has to continually check herself, remembering that until she has observed and studied the child and made several tentative attempts with him, a systematic programme of instruction cannot usefully be drawn up.

The most frequent mistake made in work with children who have handicaps or who need remedial instruction is in not going back far enough. It may be necessary to retrace one's steps right down the learning sequence so as to supply skills and background which are missing, have never been properly assimilated or have been learned in a half-understood or confused way. If the teacher has started at too abstract or advanced a level the child's difficulties will usually be increased no matter how sympathetic her approach, and subsequent retracing made even harder and more time-consuming. The child who is poor at arithmetic may need not just to learn his tables; he may need to achieve basic number concepts, such as one-to-one correspondence (accurate counting of objects), seriation and classification skills, and conservation of number (appreciating that six means the same thing, whether the objects are large or small, spread out or close together). Kephart (1960) makes many suggestions for building up motor skills along similar principles. No waste of time is involved, for if the child does not master the basic skills he will never make real use of more advanced ones even if he manages to acquire some at a mechanical level.

Work on language, as well as the study of intersensory skills referred to earlier, has useful implications. If instructions and other verbal help are supplied, subnormal children can often learn much better. Verbal instruction needs to be clear and simple and often repeated, and physical action may be used as an accompaniment to it, as in Séguin's classic example. He had subnormal children climbing ladders to strengthen their number concepts, chanting 'one' on the first rung, 'two' on the second and so on. In the same vein Russian psychologists have taught children to sing, using an oscillograph—the child can modify his singing by seeing the different sound waves produced by different notes.

Programmed instruction is a developing field and one which may prove of especial value in the education of the subnormal. The crucial advantages lie in the minute analysis of skills necessary in preparing the programme, so that one has a fully worked out sequence of tiny steps, each of which can be fully mastered before going on to the next. Immediate correction (often controlled by the child himself) means that learning is immediately rewarded and mistakes eliminated. An incidental benefit can be a saving of time for the teacher who can leave a child to work on his own while she is occupied with another one. Programmed material cannot replace the teacher, particularly with the subnormal, for she is needed to prepare the child, to help and reassure him, to make sure that the work is at the right level, and the steps of the right size.

Perhaps the writer's favourite principle in the education of the subnormal is that of explicitness. Sometimes, of course, the teacher is at fault in not having worked out her immediate and long-term goals clearly and planned how to reach them. But all too often she does this successfully and yet fails to communicate them to the child. Children need to know what they are doing, what it is for and where it leads, and this is particularly true for the subnormal. Long-term goals may not need to be repeated over and over, though they should certainly be brought up from time to time, but immediate aims should be constantly brought to the fore. The child should know, *at his own level*, what he is aiming for, and frequent explanations are invaluable to him. They may help in particular in alleviating the attention or input difficulties mentioned earlier.

CONCLUSION

[illegible] children are often very dependent on adult sympathy a[illegible] they are to succeed. As Morgenstern *et al.* (1966) have str[illegible] a recent book, the first relationship between the teacher or therapist and the child is very delicate and has to be developed with care. It the adult can establish a bond of trust with the child and can find the right avenue of approach, considerable progress may be possible. If this is not achieved the child may remain negativistic and inaccessible.

To be successful, the education of the subnormal needs exceptionally sensitive and intelligent teachers. It is not economical, because class teaching, though it has obvious social value and some educational contribution too, must inevitably play a smallish role in a special school or training centre. The children have such individual needs and reactions that frequent individual work will always be necessary. If this is possible, it can be immensely rewarding. Whether a society such as ours agrees to provide really effective services is a measure of its humanity: the decision is a social and a political one and not just a matter of purely educational principles.

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Programmed learning and the severely subnormal

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The history of programmed learning cannot yet be written, it is in the process of being made. To date the results which have been obtained with this new teaching technique show that, when compared with conventional instruction, programmed learning is not inferior to it, and that in certain respects it has marked advantages. The development in auto-instructional devices which has taken place in the last ten years has been remarkable. There has been an increase both in the volume of machines available and in the quality of programmes offered to schools and institutions. This method of learning has been used successfully with children having a wide range of abilities. The evidence from research on ESN children with programmes which cover a wide range of school subjects, such as spelling, arithmetic, reading, etc., shows clearly that this method is not reserved for those children fortunate enough to be born with a high level of intelligence. It is natural that we should begin to wonder if this technique has any application to the instruction of the severely subnormal child. Before coming to that part of this chapter it may be useful if we examine some of the basic principles which underpin programmed learning.

The psychological principles of programmed learning are derived from experimental work with animals. The original dogmatism of the learning theorists is gradually being replaced by a more pragmatic approach to materials and methods. The early theorists extended the rationale developed to explain how animals learn, to an explanation of how human learning takes place. The fundamental notion used to account for learning was the idea that the organism is inclined to learn tasks better if it is rewarded. When the principles of programmed learning are set out they appear similar to the principles employed by most good teachers.

Teachers of the ESN and SSN child will see in these principles ideas which are commonplace in their remedial teaching, and will see at once why programmed learning has such an obvious affinity for those working with children with learning difficulties.

In working through a programme a child works at his own pace. This is an idea which, in the classroom, is realized as a recognition of individual differences in children's learning ability, span of concentration, etc. In a programme the task before the child is broken up into easy segments. In school we try to do this as far as we are able. In programming a task the programmer tries to motivate the learner by giving him a kind of reward which is immediate confirmation of the correctness of his answer. Can we do this in school? Not always, because the teacher is only able to give knowledge of results when the child has completed many operations; the child may have to wait some time before it is his turn to see the teacher. If he has made a mistake, the delay between the mistake and its correction may be of such a length that he cannot remember why and how he made the error. In doing a programme the child is usually active in the learning situation and again this is similar to what we try to do in special education—we try to get away from the idea of the teacher as a transmitter of information and attempt to make the learning as child-centred as possible. Here we might contrast the traditional approach to computational arithmetic with the dynamic learning which is possible with structured mathematical materials such as Colour-Factor or Cuisenaire.

Williams (1966) describes these fundamental principles of programming as:

> 'to present the learner with information; to elicit from him a response to this information; to apprise him of the appropriateness of his response (feedback). The material for a learning course is presented to the learner in small digestible steps (frames). These are selected and ordered so as to give him the best chance of making the correct response with the minimum of effort needed to interpret and assimilate the material.'

This brief description will serve for machine or book programmes.

The theoretical background for programming is in great part the work of B. F. Skinner. He evolved from his experimental work with rats and pigeons a psychology of human learning which gave a theory of how to provide a learning environment which would maximize the student's potential for learning. Skinner (1961) described the extensions of his work with animals and how it led to programmed learning. He showed in a remarkable series of experiments how it was possible to train animals to perform the most complex sequences of behaviour through the selective use and timing of reinforcements. Skinner says,

> 'What is involved is the arrangement of a series of very small steps through which an organism can be led into the acquisition of complex forms of behaviour. With these techniques behaviour can be shaped as a sculptor shapes a lump of clay.'

He notes elsewhere that it has become a routine exercise in his class to demonstrate this technique with a pigeon.

> 'Simply by presenting food to a hungry pigeon at the right time it is possible to shape up three or four well-defined responses in a single demonstration period—such responses as turning round, pacing the floor in a pattern of a figure eight, standing still in a corner of the demonstration apparatus, stretching the neck, or stamping the feet—in such demonstrations one can see learning taking place. A significant change in behaviour is often seen as the result of a single reinforcement' (Skinner, 1962).

As important as shaping up behaviour is the ability of the experimenter to maintain that behaviour in given states of strength for long periods of time. Various types of reinforcement strategies were experimented with in attempts to maintain behaviour. From these experiments it was discovered that the manner in which an organism is reinforced influences that organism's response capabilities. The arrangement of rewards is called a schedule of reinforcement. The ways in which reinforcements are scheduled are many, but the results though complex are orderly; each schedule elicits its own distinctive performance. Some of the main types of schedules are: fixed ratio, variable ratio, fixed interval ratio, and variable interval ratio.* To reiterate, animal behaviour can reach extra-ordinary degrees of complexity in the hands of an experimenter using this technique, and that complex behaviour can become a relatively stable accomplishment, provided the organism is motivated by a suitable schedule of reinforcements.

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* These refer to schedules of rewards prescribing when the subject is to be rewarded, either in terms of *time* intervals or *successions* of responses. Rewards may be given continuously (every response rewarded) or intermittently (partial). For the latter there may be many variations, and the rewards may be periodic or aperiodic. The ratio between rewarded and non-rewarded responses may be fixed or variable. *Variable ratio* = one reward for every five responses, every ten responses, etc. *Fixed interval* = one reward every 3 minutes, etc.

One of the more interesting findings in this area has been the discovery that, when building up a pattern of behaviour, reinforcement after each stage inclines the organism to learn that pattern at an optimum rate. When the new learning has been mastered, the behaviour is best maintained not by repeatedly rewarding each section of the task, nor even by rewarding each completed task, but by a system of rewards which occurs in an irregular fashion, called partial reinforcement.

That this relationship between response and reward is not confined to infrahumans can be seen clearly in the work of Orlando and Bijou (1960). Using 46 institutionalized retarded children with IQ's from 23 to 64, Orlando and Bijou were able to show the characteristic performances under four basic schedules. The performance of the retarded was similar to non-retarded children and to infrahuman subjects.

It was soon realized that the experimenter could not personally supervize the shaping-up process. The laborious nature of the task can be seen by reference to one of Skinner's pigeons who emitted 73,000 pecking reponses in 5 hours. 'It is unthinkable to try and arrange by hand the subtle contingencies of reinforcements that shape behaviour. Instrumentation is essential' (Skinner, 1961). Automatic devices are commonplace in experiments with infrahumans. They have also been used with human subjects. In the Orlando and Bijou experiment mentioned above, the schedules were maintained by a Gerbrands Universal Feeder with candy and mints as rewards.

The possibilities of using machines to teach students had been recognized in the 1920's by S. L. Pressey. Pressey designed a machine that presented students with questions linked to multiple-choice answers. If the correct key was depressed then the next question was presented. If an incorrect key was depressed the mistake was noted and the student had to try the remaining keys until he found the correct one. It was recognized that the machine would show the student at once when he was right or wrong. Pressey saw that his machine would do more than this—it would also teach and allow the student to work at his own pace. Through lack of support from educators, Pressey said in 1932 that he was dropping further work on the the machine. There were many reasons for the failure of these early machines apart from Skinner's 'cultural inertia'. Certainly one factor was that the material used in the machines was not programmed.

Skinner in the 1950's turned his mind to the problems of human learning and saw that it was possible to use the methodology developed in experiments in operant conditioning as a technique to improve human learning. He realized that learning, as it was observed in non-laboratory situations, was at the mercy of many chance factors such as infrequency of rewards. Skinner therefore suggested that if learning were viewed as a process of mastery of each small stage leading to general mastery, and if the learner were rewarded for the successful completion of each stage, then it might be possible to predict changes in behaviour with some degree of exactitude. That is, it was now conceivable that we could *make* learning take place.

In addition to learning through small steps and rewards it is thought important that the learner should be active in the learning situation. 'Except in some kinds of stimulus learning, the student should compose his response rather than select it from a set of alternatives, as he would in a multiple-choice scheme' (Skinner, 1961). The student must make, as well as recognize, the correct response. Also Skinner thinks it is important that the student encounter as little wrong or misleading information as possible. It is this idea which has led to the development of the linear programme.

In a linear programme the student is taken from the first frame to the last by a series of very small steps which have been selected to ensure that he is not confused by having too much new information, too soon. To help him to feel confident the early frames are very simple and are loaded with cues and prompts which make the process of getting the answer right almost a certainty. In a machine presentation the new material is given through one apperture and the student makes his response through another. As he works the machine to see the next frame, his previous response remains visible beneath a Perspex window with the correct answer alongside. This means that the student can see his answer but cannot alter it. Recent work with programmed textbooks shows that the book format is as successful as the machine and a great deal cheaper. What is important is not whether the material is presented in machine or book form but whether sufficient care has gone into the planning and writing of the programme.

In contrast to the linear programme, we have the branching type of programme favoured by Crowder (1960). This method tries to take into account some of the differences between students. Crowder recognizes that students come to a learning situation with different previous experiences and different previous knowledge, and that when doing the programme some students will be able to race through it while others will find some parts of the programme rather difficult and so will need extra help. The branching programme tries to take into account individual differences in learning. The material is presented in units which are usually larger than the frame. The information in the unit is followed by a question to test if the student has understood what he has read. If he shows that he has understood the material, he then moves on to the next unit. However, if he has made an error then,

> 'the preceding unit of information is reviewed and the nature of his error is explained to him and he is retested' (Crowder, 1960).

Crowder recognizes that answers are not just right or wrong, but that some answers are nearly right and some wrong answers are hopelessly wrong. His branching programme takes cognizance of the quality of each error and uses this information to provide the student with remedial material which is relevant to his needs. When a student encounters a difficulty, he does not carry on to the next unit but is diverted to a branch line where remedial action is taken to ensure that the difficulty is overcome. The great advantage of this type of programme is that it can cater for the needs of students with widely differring abilities and allows for different rates of learning. In a linear programme all students have to do all frames, which might be boring for a bright child. It is usual for a branching programme to be presented in scrambled book form.

In writing a programme the first step the programmer has to take is to define in precise terms what he wants the children to learn. This definition of the terminal behaviour provides the goal towards which all subsequent activity of the programmer is directed. The material to be learned can then be thought of as a continuum extending from the start of the programme to the conclusion. Between these two poles the programmer has the opportunity of demonstrating his skill. From the definition of the purpose of the programme, the next step is to divide the material into broad subdivisions. Each of these subdivisions is then further divided into frames which are logically connected. Each frame adds some new bit of information and prepares the learner for what is to come. So far this sounds like the preparation of a textbook. But the programmer is not content just to divide up the subject material. How is the programmer to be informed of the success or otherwise of his analysis of the subject matter? What if he has put too much information into one frame, or the explanation in another frame is confusing; or has he assumed that what was explained in frame No. 4 can be recalled in frame No. 101? It is in the solution of these and similar questions that the skill of the programmer and the advantages of the technique are brought into prominence. Each part of the programme is field tested on a population of children similar to the population of children for whom the programme is being constructed. By trying the programme, or parts of it, and by looking at the percentages of errors made by the children, he is then able to make revisions. This may be in the form of rewriting a badly expressed frame. Again, the programmer may discover that what seems easy to him is causing great difficulties to the child; this may lead to the adding of extra frames which will clear up these particular difficulties. The process of testing and rewriting is continued until the programmer can show that a very high percentage of the children can work through the programme experiencing only very few errors. This lengthy and exacting field testing means the programmer's behaviour comes under the control of the children for whom the programme is intended. It is also slowly bringing to light some of the stumbling blocks which have caused great difficulty in the past when the feedback to the teacher was rather limited.

The programme brings the student into contact with material carefully articulated to provide the student with an optimum learning environment. The motivation which impels the student is the careful grading of the material, the low error rate, the fact that the student can proceed at his own pace, and that he is rewarded at each stage by immediate confirmation when he is right. The programme acts like a personal tutor who organizes the material in a most skilful manner. Each step is mastered before new learning takes place. The programme assists with cues, prompts and hints which help the student when he encounters difficult or unfamiliar material.

From the evidence of the last ten years it is possible to affirm that the programme can teach. But can the programme teach as well as the human tutor? Williams (1966) has summarized the data in this area under five headings.

1. The human tutor is seldom more effective than the programme.
2. Frequently no differences in effectiveness is found.
3. More often than not the programme outshines the human tutor.
4. Even when no significant difference in terms of subsequent level of performance is found, the programmed instruction usually takes less time.
5. These results hold for both long term as well as short term retention.

This opinion suggests that programming is as effective as normal instruction. In addition to providing an effective mode of instruction, the technique provides interesting ideas which can often lead to further research into learning. For example, Gagné (1962) suggested that the ordering of items in a programme may have to vary for different individuals, i.e. that individuals may have idiosyncratic methods of learning.

If this factor can be isolated, it has important implications for school work.

Many teachers will readily admit that programmed instruction has an undoubted place in the education of adults and intelligent children, but wonder whether the same methods will work with children of low intelligence. The research data on frame writing may seem superfluous to the teacher who is confronted by a child who cannot read.

The increasing volume of research on programmed learning with mentally handicapped children, educationally subnormal children and physically handicapped children shows clearly that programming is a method of teaching with outstanding possibilities.

Blackman and Capobianco (1965) say that retardates have special educational requirements which are better met by self-instructional devices. The ability of the programme to give the child an immediate confirmation of the correctness or otherwise of his answer (the 'feedback' effect) makes the programme a powerful teacher. The machine is, of course, infinitely patient, never hurrying the child, who can take his own time when encountering new material. Mentally retarded children often have a history of failure with conventional teaching methods. The number of rewards they will have received during their school life will be few. Consequently many retarded children may find it difficult to learn in a social situation such as in the normal teacher-child relationship. The machine, with its personal learning environment, may allow the child to work and learn at a time in his school life when normal methods would prove ineffective. Also, though a class group may be homogeneous with regard to IQ's, the members may exhibit marked individual differences in their ability to learn. The machine can help to cater for some of these individual differences. Again, say Blackman and Capobianco (1965), retarded children need to 'over-learn' a great deal of their school work, and the machine can help in this as well. Another side benefit from the use of programmes in school is that they provide an opportunity for a review of school curriculum, methods and classroom practice. Gagné (1962) has suggested that one of the essential mechanisms of learning is a learned ability to recognize what is relevant in a problem. This ability develops with practice. Possibly programmed learning is influential in the growth of a learning 'set'.

Bradely and Hundziak (1965) experimented with the TMI-Grolier programme on telling the time. The group of children in the experiment had a mean IQ of 56. Although the programme was originally designed for normal children, it was given to the group in an unmodified form. The 440-frame programme took the children between 1½ and 3½ hours complete. The mean score on the pre-test was 2·1. The mean score on the post-test was 8·0, and the difference statistically significant at the 0·05 level.

Bradely and Hundziak (1965) concluded that the experiment showed that retarded children could learn with a programme originally planned for normal children. However, the retarded children needed more reinforcements than those provided by the programme, and the teacher had to assist them when working on the machines. Children with spatial problems found it difficult to keep their place and many found it hard to write their answers. Those with auditory autonomic problems (i.e. with special problems relating to abstract verbal meanings) had also to be helped, and children with severe reading problems found the text too difficult and needed the teacher's asistance. In spite of these difficulties it was felt that the TMI-Grolier programme helped to focus attention upon problem areas in telling the time. It showed which frames were too difficult, where frame revision would be needed and where branching extensions would be useful.

This type of research which gives details of the problems which children encounter in handling programmes and machines will eventually be of considerable assistance to programme writers. However, one type of problem may be virtually unsolvable. Bradely noted that there were some children who refused to acknowledge the fact that they had made an error. They denied the authority of the programme. If the child refuses to accept the feedback from the programme then the programme cannot fulfil its function. Again it was noted that some answers were chosen on a purely chance basis. Any programme designed for subnormal children will have to take care of this factor.

Keislar and McNeil (1962, 1963) have shown that young children aged 7 and under, with a wide range of IQ's, could learn quite long programmes on reading and science. Such programmes might be useful with older backward children. Smith (1960) successfully used a machine to teach arithmetic to a group of children with IQ's between 60 and 79. Taber and Glaser (1962) used a 74-frame programme to teach the names of colours, while Fehr (1962) reports that programming can be successful with deaf children. Stolurow (1963) describes an experiment with a group of children with IQ's between 58 and 71 who were taught reading in one of four groups. One group was taught by the programme alone. The second group was taught the same material by a combination of programme and teacher. A third group was taught by the teacher alone, and the remaining group was not taught at all. The group that made the most gains was the one taught by a combination of teacher and programme. Next came the group taught by the programme and then the group taught by the teacher.

This is an important experiment because it draws attention to the fact that, if it is to be effective, research into programmed learning must take into account the realities of the classroom situation. It also shows that some retarded children need the continuing support of a warm, affective relationship with their teacher. It is interesting to compare Stolurow's (1963) work with that of Blackman (1965). Leith (1963) has provided a useful summary of programmed research with handicapped children. Morgan (1964) has outlined a a home-made device which assists in the teaching of reading. Allied to a suitable programme, this machine could be very useful in special schools. Morgan (1966) has also shown the value of programmed instruction for deprived children. Moore (1964) has described a sophisticated device called the Edison Response Environment, which is a computer-linked teaching machine. This 'talking typewriter' has been most effective in aiding autistic children (Moore, 1965).

So far we have discussed some of the basic principles of programming and looked at some of the work that has been carried out with children with learning difficulties. The evidence is such that we can now begin to contemplate extensions of work with young normal and ESN children into such uncharted waters as the SSN.

Before commenting on what would seem to the writer to be the priorities in programming, we might ask the question, 'if programmes for mentally handicapped children are to be written, then who should write them?' It is obvious that where the material to be programmed is highly technical, then the person to write the programme is a subject specialist working with an experienced programmer. Richmond (1965) has suggested that there will probably be two kinds of programmes produced. One type will stem from the publishing houses and will be supported by large-scale finance and will almost certainly be a team approach to the problem. The other type will come from individual teachers who will construct programmes to meet short-term need in the classroom. In constructing programmes for the mentally handicapped child the teacher becomes the subject expert since the real subject is the child. In a short course run by the writer for teachers in special schools, programmes were constructed by the teachers to try to solve local problems. Topics programmed included one on the concept of quantity in conjuction with a practical activity course in the classroom; another teacher produced a programme on 'Filling in an Application Form' which was meant for senior ESN girls. One member produced a programme to help junior ESN children who were having problems with the recognition of the letters 'p' and 'b', while another programmed a series of lessons on the handling of money up to 5*s*. These programmes were constructed to meet contemporary needs in real classroom situations. It was interesting to note some of the side effects from this activity. The testing of the frames brought to light many of the hidden difficulties of the special school children. Most interesting of all the effects was that many teachers reported that they were now thinking in terms of 'programming' their conventional lessons.

Some suggestions for programmed topics are given, but there is no limit to what could be programmed if practicing teachers wish to undertake the task (and provided that they find their programmes effective). Basic number bonds provide a ready-made programme subject. The recognition of coins and notes is another. Spelling of essential words could be tackled perhaps using the 'vanishing' technique of Taber and Glaser (1962). Recognition of colours and the names of colours would make an interesting topic. Much could be done to provide the children with a programme planned to improve motor and perceptual skills. Reading, linked with a tape recorder and work cards, would be a valuable contribution. Certain important concepts lend themselves to programming, such as the concept of size, shape and texture. This could be followed by proprogrammes which develop those visual skills which are a prerequisite to reading. Jones (1966) has given an account of a programme which was designed to give correct visual habits and which teaches 'children to overcome the tendency to mis-perceive letters and words, and which is largely self-administering'. The programme appears to be successful with infants and young ESN children.

As well as these conventional topics which could be programmed by schools and centres, there is a suggestion that programming may be a way of improving children's reasoning ability. Holland (1960) has worked out a programme which 'teaches' inductive reasoning. The machine presents a sequence of coloured shapes across the top half of the screen and the student is required to select the shape below it which extends the sequence. Extensions of programming techniques to the control of behaviour in the real life sphere have been attempted, and a summary of such research is given by Thomas (1965).

Programming is a technique which has important implications for special education. By the judicious use of this technique a quiet revolution in methods and attainments may take place. One of its outstanding merits is that it provides an optimistic environment for the research worker and the practicing teacher. 'Until the potentialities of these methods have been investigated it is meaningless to say that a given organism cannot acquire a given form of behaviour. When we say that a given organism has failed to solve a particular problem, it may be that we ourselves have failed to construct the necessary teaching programme. In particular, no one knows what the human organism is capable of because no one has yet constructed the environment that will push human achievement to its limits' (Skinner, 1961).

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6

Physical education of the mentally handicapped child[*]

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Our intention in this chapter is to set out, albeit briefly, the principles and practice of teaching physical education to mentally handicapped children. Physical education today is based in large measure on the pioneering work of the late Rudolph Laban in the field of basic movement. It follows, therefore, that any teacher of physical education, whatever the sphere of education, must be acquainted with these principles and be capable of applying them practically to such differing forms of the subject as gymnastics, dance, skills and games.

However, apart from the teachers possessing some technical knowledge of the subject, other considerations weigh just as heavily, if success is to be achieved. These will be dealt with at some length later in the chapter. Suffice it to say here that the watchword of anyone undertaking this difficult though rewarding work should be that of positive encouragement. Many handicapped children lack the natural desire to exercise mind and body; it is only by constant encouragement that this desire is born in them.

Given these conditions, the long-term benefits to mentally handicapped pupils will be threefold. Firstly, the movement experience acquired in such fields as gymnastics, dance, games, skills and swimming improves individual ability over a wide range of activities, thus making the child more self-reliant and confident. Secondly, in the case of dance, he learns to think creatively and move expressively and, equally important with this and other group work, he learns to function as a unit of a larger entity; the beginning of social awareness. Thirdly, mind and body, both in and through physical education, are being educated continuously to meet and surmount practical challenges and difficulties.

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[*] I should like to express my thanks to my two colleagues, Julie Harrison and Joe Gridley, for their help in the writing of this chapter.

We must endeavour to make the children aware of the existence of competition and to experience a little of it for themselves, remembering that great care must be taken in the handling of this type of activity.

The children may enjoy a school sports day or inter-school games. These would be beneficial insofar as the winners are acknowledged —the others also receiving their due word of praise and recognition.

Surely our main aim in physical education is to encourage the children to want to take part, which should inevitably happen if the main stress throughout is laid upon enjoyment.

There remain the practical aspects of day-to-day teaching: planning the P.E. programme in the centre, the teacher's attitude, teaching methods, terminology to be used, approach to the class, the place of competition. These are just some of the items which we will be considering individually in this chapter.

Finally, there is no doubt whatsoever, from the experience so far gained, that where a balanced programme of physical education exists, the mentally handicapped child derives incalculable benefit mentally, physically and socially.

TEACHING AIMS

These are quite simply to realize to the full the triple benefits of a well-planned course of physical education as we have just envisaged them. We can achieve these benefits by presenting the subject boldly, imaginatively, in a manner both varied and attractive.

Physical development

The advantages to the pupil are various. Some are common to any group of students participating in physical education; others are specific to the requirements and defects of the mentally handicapped pupil. In general the muscles will be strengthened, the joints mobilized, and a 'feeling' for movement enhanced. These are of particular value to the handicapped pupil, for poor physical development and a certain muscular incoordination are quite frequently the concomitants of mental retardment. For the same reasons the development of stamina and physical endurance claims an equal priority, quite apart from the beneficial influence on the child's general mental attitudes. The consequent improvements will also help to build up self-reliance.

Specific physical defects, e.g. of posture, with which some of the pupils will have to contend, can be alleviated by specially designed remedial exercises supervized by the teacher, through the collaboration of the medical staff. It is only with a coordinated programme of treatment that these inherent weaknesses can be corrected.

Mental development

'*Mens sana in corpore sano*.' Mind and body are one and indivisible. They complement each other, interact mutually, are interdependent. The teacher strives to educate the whole child rather than merely train the body and its purely mechanical aptitudes. At the same time in language development a new vocabulary will be added.

Social development

Group activity is the genesis of corporate feeling and action. The child must be given a sense of security by making him feel one of a group, by drawing him in gradually to the work of the group, and by giving him work to perform well within his scope. Having achieved this feeling of belonging, the teacher aims to build up the child's self-confidence and self-reliance. Performing individual skills in gymnastics, competition with others in games and relays and in swimming: all these develop the pupil's personality, make him an emotionally balanced individual. Only then can he look out upon the world and collaborate with his classmates; then the child can begin to work with and share ideas with a partner in a simple activity —he may lead a group of fellow pupils or be led by a member of the group. Finally he learns to function as a member of a larger entity, the class.

It is axiomatic that this merging of self into group, this acceptance of an authority higher than that of the individual, will help these children to feel an integral part of the community and play a more creative role in it. At the same time, this is not to say that the pupil's personality is to be submerged, his identity be lost by excessive conformity to the group ideal. The teacher must strike a balance between the two conflicting poles. Of course, the pupils must be taught to have due regard for others and to work with them, but he must also be encouraged to develop qualities of self-reliance, courage and independence in his everyday life.

THE PROGRAMME

Ideally a daily lesson of some form of physical education should be the aim. Distribution may vary according to facilities available and possibly time of year. However, the following types of lessons should be included if possible:

(a) One skills lesson using small apparatus; this can be progressed to the playing of games.
(b) One dance lesson.
(c) One swimming lesson.
(d) One educational gymnastic lesson including general movement training, and finishing with agility work using large apparatus.
(e) One outdoor games lesson—this could be combined with (a).

Each of these lessons caters for a different type of movement. In the educational gymnastics lesson the movement involves weight bearing on different parts of the body, rolling, running and jumping. Through learning these activities, the child is able to manage his body when negotiating obstacles.

The skills lesson with small apparatus gives the children the opportunity of learning to handle objects and to learn skills that will help them in the playing of games and taking part in athletics. This type of lesson could be taken outdoors.

The dance lesson provides opportunity for the child to move in an expressive way. The movement training here will not result in the functional ability to overcome obstacles, but in the ability to create simple dances either without accompaniment or as a response to sound stimuli such as percussion, piano, or record.

Thirty minutes would be adequate for each type of lesson. For nursery classes 15 minutes would be sufficient.

For all lessons in physical education children should be suitably attired. It is worth while paying particular attention to this important item. Indoors, if the floor is splinter-proof the children should wear either plimsolls or be barefooted. Outside, plimsolls should be worn. Pants with vest on top are suitable for the lesson. Girls should not wear dresses or skirts as they impede movement. Tucking these into pants is unhygienic. Children will perform better physically, will be more attuned mentally if they are suitably clad. Insisting on correct dress is worth any amount of effort and time that may have to be spent on it. Daily encouragement will no doubt be necessary on the part of all the staff in a centre.

THE LESSON

Any lesson in physical education taught to any group of mentally handicapped children should be methodically planned beforehand in full detail. Only the very gifted and experienced teacher can teach well spontaneously. It is doubtful whether such a person could attempt this approach with mentally handicapped children. We shall deal with lesson preparation under five headings: lesson plan, and content, equipment, markings and terminology.

Lesson plan

A suggested lesson plan follows for each of the different types of lesson:

1. opening activity,
2. movement training/skills training,
3. climax (dance sequence/game/apparatus).

The opening activity will be aimed at some form of general locomotion about the floor. Vigour should be the aim, and the children encouraged to space out well whilst moving. The middle part of the lesson will include simple activities based on a suitable theme selected by the teacher. Lastly, the climax will perhaps, in the case of gymnastics, involve the use of small or large apparatus with the movement theme taught earlier here applied, after a time given for free experiment on the apparatus. In the dance lesson, the climax will take the form of a simple dance based on the main idea behind the lesson. In the games lesson the climax will be the playing of a game.

Lesson content

This will be dealt with in detail later in the chapter. However, at this stage, it cannot be stressed too strongly that the content of the lesson, material and activities to be taught must be thoroughly planned and thought about before presentation to the children. All work taught must be suitable to the needs of the children chronologically and mentally. Work should be carefully graded so that steady progression is possible. Often the very simplest of lessons convincingly taught are the most successful with this type of child. The class should not be overburdened with too much variety of activity, for the child will learn the most physically and mentally from simple lessons taught in an interesting way.

Equipment required

This will vary according to the type of lesson to be taught. Equipment needed for the lesson must be thought about beforehand and arrangements made for access to it, use and transportation. Small apparatus must be arranged in the room beforehand so that the children can select their own without having to queue or look for it. The four corners of the room provide a suitable place. In the case of agility apparatus the teacher must plan its position in the room. It must be suitably spaced so as to avoid overcrowding and accident. Benches, large mats, boxes, etc., must be situated in suitable places where the children can reach them for transportation. All equipment should be handled correctly and moved with care. Time should be spent on instructing the children in the correct way of handling and carrying the different types of apparatus. The children should never be hurried in its transportation—'carefully and quietly' should be the words selected here, never 'quickly'. Emphasis at all times should be placed on safety and care.

In the dance lesson, instruments to be used must be at hand, records ready to play, or piano music arranged in correct order.

Markings

Floor or wall markings may be required for a lesson. Whenever possible, these should be made beforehand to facilitate smooth and efficient running of the lesson. Children easily become restless and impatient when having to wait about unnecessarily.

Terminology

It is wise for all teachers of mentally handicapped children and essential for less experienced teachers to plan their diction in detail beforehand. True this may have to be adjusted as the lesson proceeds, but as *words* used in the teaching of physical education are of great importance—indeed the success of the lesson may depend on their careful selection—it is well worth while to decide beforehand the way that the lesson will be worded.

Mentally handicapped children respond to simple direct phrases. No doubt must be left in the child's mind as to what is required of him. There is no place in the physical education lesson for lengthy involved sentences. The following example might be of help as the introduction to a gymnastics lesson:

'When I say "Go" run about the room.'
Be ready to join in in case there is no response.
After a suitable length of time say 'Stop!'
Coach whilst the children are moving but emphasize only one teaching point, plus space; e.g. 'Run lightly, look for the spaces.'

TEACHING METHOD

There are a variety of ways of teaching a physical education lesson to children. It is not our intention to state a set way on how this should be done; we shall suggest, however, as a result of experience, certain methods that have proved successful with mentally handicapped children.

Response to command

This we consider to be the first essential in teaching children both for reasons of safety and if any progress is to be made. Immediate response to instruction must be insisted upon at all times. There would be little point in carrying on with an activity or in the performance of a task if only a proportion of the class were participating. There should not be need to address the children as individuals in class or group teaching. This need, however, may arise if the teacher wishes to praise a particular child or to encourage another who may need help.

Certainly until the teacher is well known to her class and their response to her is complete and spontaneous, it might be advisable at the beginning of the lesson for the teacher to train the class in simple command and response. The following example might be of use:

> The class is waiting outside the door of the school hall.
> 'Walk inside, sit on the floor in a space.'
> The teacher stands by whilst the children are doing this. She then stations herself in front of the class in a position where she can be clearly seen. When all the children are seated and settled—'Stand'. If all respond, say 'Good'. Then proceed with the lesson.

Similarly if the attention of the class wanders during the lesson it may be necessary to recall them by simple command. 'Sit on the floor—everyone.' Ideally the physical education lesson should not proceed until the teacher has the attention and participation of the whole class. Important points mentioned previously in the chapter such as suitable terminology, clarity of speech, position of teacher in the room, content of the lesson suitable to the needs of the children, will contribute to the general attitude of the class being taught.

Mentally handicapped children respond to constant encouragement, praise for something well done or for trying hard, and most of all to a smile.

Observation

The teacher must observe the children at all times. By intelligent observation she will learn how individuals and the class in general react to her teaching programme. Also the safety of the children will be guarded. She will learn much about the abilities and personalities of the children, thus helping her in their education.

Demonstration

Opportunities can be provided in the lesson for the children to learn by demonstration on the part of a child selected by the teacher or even on the part of the teacher herself. One half of a class could demonstrate their activity to the rest of the class. The following points are important:

1. the same child is not chosen each time,
2. the demonstration must be short,
3. all the children can see the demonstration,

4. bad work must never be shown,
5. the children are immediately given the opportunity to practise what they have seen.

The teacher's contact with the class

The teacher must not be 'one' of the class or become at all 'involved' with the personalities and difficulties of the children. This does not mean that she must not be *interested* in their personalities and difficulties—this she must be to become a successful teacher. The teacher must strive at creating the sort of relationship with the children in which they respect her as a teacher and as a person, know exactly where they stand in regard to the things that they are allowed to do and are not, at the same time knowing that their teacher is a person who will receive them at any time for anything and will help them whenever the need may arise.

Records

It is advisable for all teachers to keep written information on the children. It is obvious why this need is particularly important in the teaching of mentally handicapped children. Day-to-day records on work and behaviour serve as a guide to the personalities and abilities of the children—the ways in which they react to different situations. This type of information will be of great help in planning lessons, in teaching itself and in learning more about the children.

Competition

A limited amount of competition is beneficial to and enjoyed by mentally handicapped children. We would not include competitive activities in every physical education lesson; we might include a competitive activity occasionally. This could be introduced into the lesson as a group competition rather than an individual one. We would not praise too highly the winning group—merely comment upon it and also have a word of praise for the rest of the class.

BASIC MOVEMENT ANALYSIS

Movement can be considered under four main headings:

1. what we move (the body),

2. how we move (quality),
3. where we move (space),
4. with whom we move (relationship).

1. **What we move** (the body)

The body is the instrument of movement. Body action can be considered in the following ways.

(a) *Body Activity*
The body can perform activity in dance or gymnastics. Body movements can be functional, serving a practical purpose such as surmounting obstacles or handling objects. In this category are gymnastics, games and athletics. Movements of the body can be expressive, as in creative dance.

(b) *Body shape*
The body can assume various shapes.

(c) *Body parts*
Parts of the body can initiate, predominate or lead a movement.

(d) *Body symmetry*
Both sides of the body can move simultaneously, or one side of the body can be particularly emphasized.

2. **How we move** (qualities of movement)

(a) *Weight*
This covers the use made of the body weight and muscular action. It is possible to move with different degrees of strength and lightness. In gymnastics muscular effort is needed to help the body surmount obstacles—thus the purpose served here is functional. In dance when muscular effort is great there is a feeling of more tension. When it is slight there is a feeling of less tension.

(b) *Time*
Movement takes place at different speeds. It may be sudden, taking up very little time, or sustained, prolonged over a period of time.

(c) *Space*
Movement can be made along a direct pathway in space or along a flexible pathway in space.

(d) *Flow*
Flow of movement can be:

(i) bound,
(ii) free,

Bound flow is experienced when a movement can be held without difficulty.
Free flow is experienced when a movement is difficult to stop.

3. **Where we move** (space)

(a) (i) *Personal space*
The body is surrounded by space. From a stationary position it can move into this space using different directions and levels.
(ii) *General space*
The body moves into the general space when it travels.

(b) *Direction*
The body can move forwards, backwards, sideways.

(c) *Level*
High, medium and low. High level is above the shoulder, low level below the hips, and the medium level between these two.

(d) *Air shape*
A pattern in the air can be round, twisted, angular or straight.

(e) *Floor shape*
Floor patterns may also be round, twisted, angular or straight.

4. **With whom we move** (relationship)

Movements may be made alone, with a partner, or in groups.

EDUCATIONAL GYMNASTICS

In the educational gymnastics lesson we are aiming at educating the whole child rather than merely concentrating on exercising the body by a series of set activities imposed on the children by the teacher. The educational value lies not only in the finished product but also in the trial and error of learning. The teacher aims at presenting activity in such a way as will encourage the child to think, experiment and possibly create, and finally to apply his knowledge in different situations. All children differ in both physical proportions and in the rates at which they learn. By working at their own levels of ability, each child can make some contribution to the lesson and succeed in his own way. Briefly, therefore, our main aim is to give the children an understanding of what they are doing, how they are doing it, where, and with whom.

We will now consider the movement analysis with specific reference to educational gymnastics, bearing in mind that all movements are functional in type.

I. **What we move** (the body)

(a) *Body activity*

Gymnastic activity may be:

Travelling of any kind over the floor, e.g. running, stepping, rolling. The children should be encouraged to use all the floor space and move vigorously.

Jumping (movement off the floor). The quality of the jump must be emphasized, i.e. strong take-off to give the feeling of flight, clarity of body shape in air, relaxation on landing.

Variety in jumping.

Using different directions, turning, different body shapes in flight.
Taking off from two feet, landing on two feet.
Taking off from two feet, landing on one foot.
Taking off from one foot, landing on two feet.
Taking off from one foot, landing on same foot.
Taking off from one foot, landing on opposite foot.
Moving jumps can be taught, or jumps on the spot.

The use of apparatus in jumping. Apparatus can be used to jump over or around and through, e.g. small mats, canes, hoops.

Weight-bearing activities (on the floor). In teaching weight bearing, the aim is to develop body management. The ability to balance is being trained and also the ability to transfer weight from one part of the body to another. The transition should be smooth and controlled.

The children can be taught to support and to balance their weight on body parts. Transition can be made between one still position and another—attention can be drawn to shape and, later, variation in speed or level. First of all the children should be given the opportunity to support their body weight on their hands and feet. When the arms are strong enough the body weight can then be taken on the hands, e.g. crouch jumps, or handstands. Later, other body parts can be introduced for weight-bearing activity, i.e. side of body, hips, knees, etc.

Progression of body activities. These body activities can be combined to develop sequences. Sequences can be formed within the separate activities themselves or by the combination of two or three different activities.

Sequence example within the activity of travelling. Running followed by skipping—alternating the two several times.

Sequence example within the activity of jumping. Leaping (travelling) followed by jumps with feet together on the spot.

Sequence example within the activity of weight bearing. Balancing on one foot followed by a crouch jump (weight supported on arms), the two would be alternated (*Rolling* hands—parts of back in turn—feet).

Sequence example made up of three activities combined. Running (travelling), followed by jumping and landing, followed by a crouch jump (weight bearing on hands). The activities in a sequence must be followed on. There must be no pause between them as the purpose behind a sequence is to explore the possibility of linking the activities to form one movement.

(b) *Body shape*

There are four basic shapes the body can assume in educational gymnastics; these are referred to as:

twisted,
curled,
extended wide,
extended narrow.

Body shape can be observed and drawn attention to whilst body activities listed above are being performed. Body shape in itself can provide a theme for a series of lessons. Sequences can be built up, changing from one body shape to another. In teaching shape it is essential to stress clarity so that it is apparent exactly which kind of pattern or shape the body is assuming at any given time.

Sequence example based on body shape. A handstand (extended narrow shape) into a forward roll (curled shape) into a cartwheel (stretched wide shape) or jump with a stretched wide position of body in air.

(c) *Body parts initiating, predominating, or leading a movement*

The child can be made further aware of the different parts of his body, and what they can do, by emphasis laid on different body parts. For example, in teaching a series of lessons on body shape, feet and legs alone would be emphasized stressing the variety of patterns that can be formed—clarity of pattern.

Parts of the body can lead a movement; e.g. the upper part of the chest can lead a leap to help give a feeling of flight in the air.

In skipping (travelling) the movement can first be led by the knee, followed with the toe pointed to give a good extension of the ankle joint.

2. **How we move** (quality)

Weight element

The term 'weight' refers to use made of the body weight and also muscular action. In educational gymnastics, muscular effort is required in order to serve a functional purpose such as jumping to clear a mat or rope, or effort required in climbing a rope.

Time element

Time quality is shown by suddenness or sustainment in movement.

In gymnastics the body can accelerate suddenly, jump suddenly or perform a cartwheel in a sustained, prolonged way. The interchange between body shape can be performed either suddenly, or with sustainment. The 'going up' into a handstand may be sustained, whilst the 'coming down' might be a very sudden action. Sustained travelling can be contrasted with sudden acceleration. A whole variety of rhythms can be built up concentrating on variation in pace of movement. Sequences of body activities can be built up, changing the pace of movement within the sequence.

This is an advanced theme and should therefore be introduced at the end of the teaching scheme of work.

Space element

Movement can be thought of qualitatively in terms of space. The movement may follow a direct pathway or it may be flexible.

Flow

To move smoothly and easily is one of our main aims in the teaching of gymnastics. The child should be encouraged to move smoothly between the different positions that can be held, or in the performance of a simple sequence (flow), as a contrast to an uncoordinated uncontrolled movement.

Bound flow and free flow

Bound flow is when a movement can be stopped at any time without difficulty; most movements or activities in gymnastics would be termed 'bound'. An example of the 'free flow' type might be a cartwheel off the end of a box, which could not be arrested in flight.

3. **Where we move** (space)

Personal space

From a stationary position the body can extend itself into the personal space: For example, in gymnastics, from a standing position the body can stretch upwards to thus show a stretched narrow shape; this could be followed by a curled shape—near to the floor.

General space

The body moves into the general space of the room in any travelling movements.

Direction

Movements can be performed in forwards, backwards or sideways directions or diagonally. These directions can be applied then to almost any activity taught in the gymnastic lesson. Sequences can be built up with direction as the main idea behind the composition.

Example of sequence based on direction

Travelling forwards, followed by a jump moving sideways, followed by a backward roll (moving backwards). This is an illustration of how direction can be introduced combining three different body activities.

Example of sequence based on direction, concentrating on the body activity

Jumping. Leaping, travelling forwards, followed by jumps from two feet onto two feet, travelling backwards or maybe sideways.

Levels High, Medium and Deep. In gymnastics, high travelling, jumps, stretches upwards will take the body into the high level; crouches, rolling, low travelling will take the body into low level. Levels of movement can form the main idea behind a series of lessons. In addition to the whole body in action, body parts can be extended into the high level—hands in stretches—heads made high—feet made high—this would be made possible in the performance of a handstand, cartwheel or merely a still position of the body where the weight was supported on one foot and both hands with the other leg stretched upwards.

Movement sequences can be built up on this theme. For example, three different parts of the body could be made high in turn—both feet, followed by both hands, followed by head, with clarity stressed and a smooth flow between the still positions. Similar sequences can be built up where the body is travelling about the floor as opposed to a stationary position.

Air pattern

There are three basic shapes of movement here.

(a) Round shapes.
(b) Twisting shapes.
(c) Angular shapes—here there is a sharp change in the direction of the movement.

Floor pattern

The above three basic shapes can be traced on the floor of the room in which the lesson is taking place. Movements can be made along these three different types of pathways.

4. Relationship

Children can work on any activity alone.

Activities in pairs

Matching movements.
Moving in opposition to each other.
Supporting one another—jumping activities.
Any movement sequence could be adapted to pairs.

Groups

Groups working on different pieces of apparatus.

Lesson planning

Examples of lesson plan.

1. Travelling activity
2. Jumping
3. Weight-bearing activity
4. Work with large or small apparatus

The three body activities could be included in each lesson, depending on the ability of the class.

The lesson. The work on the floor in the early part of the lesson will give the children the chance to experiment with general movement ideas—these can then be applied to the apparatus later in the lesson. Each lesson should contain all the activities listed above. When first using climbing apparatus, opportunity should be given for the children to explore it and move on it using their own ideas—the teacher here can gain a lot from observation.

When starting to teach the gymnastic lesson, the teacher will be thinking about response, safety, enjoyment and the particular activities which she aims to teach in her lesson. For a time, until the children have learned to manage their bodies on the floor and on the apparatus, the lessons should consist merely of very simple ideas based solely on the body activities.

Example of an early type of lesson

1. Travelling, running freely about the floor—concentrating on soft footwork, stopping at command.

2. Standing in a space—practice jumping off the floor and coming down softly.
3. Travelling about the floor with hands and feet on the floor (keeping heads up).

As a progression from this early type lesson, different types and ways of travelling can then be introduced—skipping, galloping, hopping, as mentioned in the movement analysis, or perhaps running followed by jumping, thus forming a simple sequence. More weight-bearing activities can be explored, i.e. travelling on two hands and two feet:

(a) with the front towards the floor,
(b) with the back towards the floor,
(c) alternating front and back.

Repeat the above with hands and feet close together or far apart. Weight bearing on the hands kicking the legs in the air, etc.

If climbing apparatus or other large apparatus is not available, small apparatus such as hoops, ropes, canes, individual mats can be used as the climax to the lesson.

Hoops can be used for:

(a) running round,
(b) jumping over,
(c) putting the hands in the hoop and running the feet round the outside.

These three activities would follow on from similar ones taught in the earlier part of the lesson.

Movement themes

When the children are able to tackle the simple interpretations of body activities, movement themes should then be introduced. Thus the lesson should be prepared and presented around one of the principles of movement defined in the movement analysis. Although one central theme must always predominate, other aspects of movement are bound to be included; these however remain subsidiary to the central theme and are not stressed.

Three examples of possible lesson themes

1. Body shape

2. Direction of movement
3. Contrast in speed—sudden and sustained movement

Selection of movement themes

The following list is a suggested order in which movement themes can be introduced. It cannot be stressed too strongly that the theme should provide the main idea behind a number of lessons before the next theme is introduced. Ways of varying the particular theme can be thought of to add variety to the lessons.

Good control of body weight is essential for general body management and safety. Considerable time therefore should be spent in dealing with the first two themes suggested before moving on to the more advanced ideas.

1. Receiving weight
2. Transferring weight
3. Curling and stretching
4. Twisting
5. Levels of movement
6. Directions of movement
7. Body shape
8. Speeds of movement

The apparatus section of the lesson thus provides opportunities for the lesson theme to be applied to the apparatus—large or small, whichever may be available. Movement themes are superimposed upon the basic body activities by their introduction; the structure of the lesson is in no way changed.

Example of lesson with introduction of movement

Theme. Curled and stretch movements (body shape).

Opening. Some form of locomotion, at stop holding curled and stretched shapes alternately.

Main Part.
1. Jumping, showing stretched shapes in air.
2. Jumping, showing curled shapes in air.
3. Weight bearing on hands and feet, alternating between curled and stretched out shape.
4. Rolling stretched and curled alternately

Climax. Apparatus: individual mats, canes.
1. Stretch jump with a cane, followed by curled roll on mat.

2. Crawl under cane curled (weight supported on hands and feet), followed by travelling over mat stretched (weight supported by hands and feet).
3. Crouched jump over cane, followed by stretch jump over mat.

DANCE MOVEMENT ANALYSIS*

1. **What we move** (the body)

(a) *Body activity*

Locomotion. This means any way of travelling about the floor—any kind of stepping, running, skipping, etc. The children should be encouraged to use all the floor space.

Elevation. This is any activity involving movement off the floor. Varieties of jumps in the gymnastic analysis can be applied here. Jumps can be made in different directions. Twisted, spread and straight narrow shapes can be made in the air.

Turning. This means any movement where the body is changing its front–spinning, spiralling. These movements can be carried out on the spot or travelling.

Opening and closing. In opening, the body is broadened; in closing, the reverse. One side of the body may experience the movement or both sides. This can be done on the spot, or travelling, or when turning.

Gesture. This is movement of the arms and legs in the air when they are not bearing weight.

Rising and falling. In rising, the body is reaching in an upwards direction; in falling, the movement is the reverse and the body descends.

Advancing and retreating. Advancing means the body moving forwards, the arms reaching in a forwards direction; in retreating, the body withdraws.

Sequences. These body activities can be combined to form sequences. Sequences can be formed within the particular activity itself or the combining of activity.

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* The editor and author express their thanks to the author and publishers for permission to quote 'Dance Movement Analysis' from *Creative Dance in the Primary School* by Joan Russell (1965) published by Macdonald and Evans, London.

Sequence example within activity of locomotion. Walking with small near steps, followed by striding. (This could be accompanied by a drum or a tambour, changing the rhythm of the beat to correspond with the particular type of locomotion.)

A similar sequence could be built up within the activity of elevation, e.g. two different types of jumps.

Sequence example combining locomotion and elevation. Travelling, followed by elevation. Running, followed by leaping—this could be repeated several times.

Other types of combinations are possible such as: advancing, rising and opening (or the reverse), retreating, falling and closing. Advancing, falling and closing.

(b) *Body Shape*

The body can assume four basic shapes.

Twisted shape.

Ball shape—the body here is ball-like in shape and surrounding a centre.

Wall shape—a flat, broad shape.

Arrow shape—the body assuming an arrow-like position with the point of the arrow clearly defined.

Sequences can be built up, changing from one body shape to another; e.g. wall shape moving to ball shape (repeat).

Groups can assume the above shapes; group sequences can be created where the group changes from one shape to another.

(c) *Body parts—initiating, predominating in or leading a movement*

Body parts (i.e. hands, knees, elbows, feet, head and shoulders) can be particularly active separately. 'Dancing with the knees', 'dancing with elbows or hands', etc. Sequences can be made up dancing with one body part followed by another, either on the spot or travelling.

Body parts can lead the way in movement. Rising could be led by the head, hands or elbows or maybe one elbow—this could also apply in falling.

A particular part of the body might lead in locomotion. An advancing movement might be led by an elbow.

2. **How we move** (quality)

Weight element

The weight of any movement can vary. It may be firm and strong or delicate—fine touch, light. Variation in tension can be applied to activity in dance; i.e. travelling firmly or lightly, rising lightly, falling firmly, jumping vigorously, jumping delicately and lightly, advancing firmly, retreating lightly.

Time element

Time quality is shown by suddenness or sustainment. A movement (e.g. a jump) may be very sudden, excited; another movement may be carried out very slowly in a sustained manner. When selecting activities with time element in mind it is important that the activity be appropriate to the speed.

Space element

The space pathway of a movement may be direct (straight), or flexible (twisted).

Example

Rising directly—pathway upwards through the space straight.
Falling flexibly—pathway of the body downwards twisting roundabout, arms and hands weaving around one another and the body.

Flow element

Movement flow may be bound—controlled, easy to stop; or free—uncontrolled, difficult to stop.

3. **Where we move** (space)

Personal space

This is the space surrounding the body when it is in a stationary position—the body can perform movement extending itself into the space.

General space

The body enters the general space as soon as it travels.

Direction

Movements may be performed in forwards, backwards or sideways direction. Rising and falling will travel high and low, advancing and retreating, forwards and backwards, opening and closing towards each side.

Locomotion can be performed involving change of direction, can be made in different directions.

Sequences can be built up using direction as the main idea.

Levels high, medium and deep

High travelling elevation will take the body into the high level, low travelling (crouches, sitting, kneeling, lying) will take the body into the deep level. Moving in the medium level, i.e. in between high and deep, will be experienced in turning activities.

Air pattern

A pattern made in the air may be any one of the following:

straight line
curved
twisted
angular

Floor pattern

Floor patterns also may be traced in a straight, curved, twisted or angular pathway.

4. Relationship

Dancers have a relationship to each other. They may be close together, apart, following, leading, etc. One can dance alone, with a partner or as a member of a group.

Group relationship can exist as the individual relationships mentioned above.

CREATIVE DANCE

Lesson planning

In the creative dance lesson we are aiming at educating the 'whole' child through movement as in the educational gymnastic lesson. Similarly, we hope to give the child an understanding of *what* he is doing *where* and *how*. There will be a difference, however, in that he will be encouraged to think creatively and to develop his movements expressively. In encouraging the child to create we are not offering him complete movement freedom, in the sense that he interprets normal stimuli entirely to his choice.

Mentally handicapped children are not on the whole naturally creatively minded. The teaching aim must be to present the subject in such a way as to give the children a thorough movement background built up on the basic body activities and the ones listed in the dance analysis. The same one theme should provide the main idea behind a series of lessons. Whilst concentrating on this theme, other aspects of movement are bound to be included which remain subsidiary. Working in this way the child will be acquiring a 'movement vocabulary', from which, in time, he will be able to draw in order to create some simple sequence—maybe alone, with a partner, or as a member of a group. In encouraging creativity the teacher must set a task based on the lesson theme and should give the class definite guidance as to the type of response she is aiming for. For example, if the lesson theme was locomotion, the task set might be for the children to face a partner, approach each other using the means of locomotion, and dance away from each other using a different method of travelling. If the children were able to perform this simple task, they would then have 'created' a simple dance under guidance from the teacher based on her main theme of locomotion.

Three examples of possible lesson themes

1. Locomotion (firm and fine touch)
2. Qualities of movement
3. Elevation

It is advisable, particularly with younger mentally handicapped children, to limit the type of accompaniment used in a lesson; i.e. changing from piano to record to percussion would lead to confusion in the child's mind, apart from being quite a difficult task for the teacher. As far as possible, one type of accompaniment should be kept to for the duration of the lesson. It may not always be possible for the teacher to use only the percussion instrument—it may depend on the particular theme being taught—but certainly the fewer instruments used, the better.

Example of early lesson plan
Theme. Locomotion.
Instrument. Drum.
Opening. Travelling freely about the floor to a vigorous drum beat.

Main part.

1. Stepping, taking up a little space—taken freely to a quickish beat on drum, phrased with definite stops.
2. Stepping, taking up a lot of space—slower beat, use of definite stops.
3. Rising and falling to drum beat.
4. Sitting on floor listening to change of drum beat for different type of locomotion.

Final sequence. In group around teacher low—rise together—move away from teacher into general space—travelling using a little space (quick beat)—enjoy freedom of room at slower beat—return to teacher—locomotion occupying large space—finish high—all sink around teacher into deep level. Repeat several times.

Example of later lesson plan
Theme. Body shape.
Instrument. Drum.
Opening. Travelling freely about floor to drum beat, hold ball shape firmly. Repeat several times.

Main part.

1. On spot—moving out into wall shape.
2. Individual sequence—moving from centre out into wall shape, from wall shape moving into ball shape. Repeat several times.
3. Individual travelling wall shape.

Final sequence. One group or two according to size of class.

Group wall shape moving into group ball shape (the group must have the appearance of the two shapes as well as the individuals in it).

Accompaniment

It is not necessary to use accompaniment throughout the whole of the lesson, although some form should be used from the earliest stage since it helps the children to become aware of rhythm and phrasing. The form that the accompaniment may take is varied. Piano accompaniment may be ideal, but the music chosen should stimulate the type of movement that the teacher hopes to obtain from the children. Records can be used but these should be very clear and the part chosen short so that the children can easily become familiar with it. There are some records designed especially for creative dance accompaniment. Tape recordings can be used similarly. A piece of music can be recorded on to tape and repeated so that it can be danced to a number of times. Percussion instruments are of great value, as they can be held in the hand and can be played in a variety of ways. Later the children themselves can use the instruments as either individual or group accompaniment.

The instrument chosen and the way in which it is played should be appropriate to the type of movement that the children are performing.

Percussion instruments

Drum
Tambour
Bells
Triangle
Tambourine
Castanets
Cymbals

Although some instruments are best suited to stimulate particular types of movement (e.g. bells, light gentle movements), most instruments can be played in a number of ways. It is advisable for the teacher to experiment with the instruments in order to become familiar with the handling and playing of them.

MOVEMENT THEMES

The following is a list of movement themes which may provide the central idea behind the dance lesson:

1. Locomotion
2. Elevation
3. Turning
4. Body parts
5. Body parts leading a movement
6. Body shape
7. Quality—firm contrasted and fine touch

8. Quality—sustained movement contrasted—fine touch or light movement
9. Size of movement
10. Levels of movement,—dancing high, dancing low
11. Direction of movement

GAMES AND RELAYS

These provide the physical education teacher with an interesting range of activity, giving opportunities for learning skills and thereby increasing confidence, providing periods of vigorous exercise, helping the children to work together in teams, and creating an atmosphere of competition. Playing and enjoying the game is the main aim, but the competitive aspect should not be ignored. Too much emphasis on individuals competing against each other may give rise to winning becoming too important, but group competitions where each individual contributes to the team position should have a beneficial effect on the children's morale.

Simple games requiring little preliminary explanation are best suited to the mentally handicapped. A good deal of work can be done in previous lessons by teaching the skills involved in the games chosen; e.g. skittle ball: the skills are catching and throwing a ball to a partner, and aiming a ball at a still object.

The early practice should be for individuals, each child learning to throw and catch a ball of the size to be used in the game. When a satisfactory result has been achieved by the majority of the class, the children can then be taught to practice throwing and catching with a partner or a small group. Finally, the children can practice aiming a ball at a skittle sited at a suitable distance. Once the skills have been taught, the game should be started. Only one major rule should be explained to begin with—in this case, stopping when the ball has been received and passing to a partner or team mate. It is better to start with a small number—two or three a side to begin with—the teacher moving about encouraging and coaching.

Using the same skills, other games can be taught and the children's repertoire increased. Dodge ball in its various forms is an easily organized and enjoyable game: e.g. a large chalked circle is drawn on the floor or playground and either one individual or one group or team stays in the middle. The remainder of the class spread out round the edge of the circle and aim a ball at those inside trying to score a hit below the knee. The successful shooters take the place of those hit correctly, or each team takes a turn at being the target.

Team selection should be looked at carefully so that not all the most able children are in one team. Children who are unable to run should be given a chance to join in—e.g. as defenders in skittle ball, or staying on the edge of the circle in dodge ball. The teacher should be prepared to join in at all times to keep the game alive, taking a leading part in a game such as Commando cricket, where accurate bowling is necessary. Various forms of 'rounders' can be adapted to the capabilities of the children, and games like basketball, volleyball and football can produce very enjoyable lessons.

Relay events are excellent as competitive exercises, their advantage being that they take up very little time. Relays should be carefully chosen to fit in with the skill, abilities of the children, and again they should be simple and require very little preliminary explanation. Starting and finishing positions should be clearly indicated and the exact finishing positions for teams should be clearly understood by the children. Starting with simple running relays on the shuttle principal, the teacher can gradually increase the interest and difficulty: e.g. hopping relay, bunny jumping, carrying objects such as a bean bag; ball skills relays such as football dribble, basketball dribble; sack relay; or combined exercises like pick-a-back and wheelbarrow relays. Relays combining skills of difficult kinds as in obstacle relays where the children may have to walk a narrow plank, crawl under a tarpaulin, carry an object, etc., are interesting and enjoyable.

A significant way of using relay competitions is in the school sports day programme. Such an event gives an opportunity for a maximum number of children to participate and, by making the majority of the events team competitions, everyone has a chance to contribute to the team's total score.

REMEDIAL EXERCISES

During our working day we are all performing constantly some kind of gymnastic movement, whether it be walking, running, climbing stairs, standing, sitting, or using tools, etc. The normal person can carry out these very basic movements without the slightest thought. However, these apparently normal skills may become complicated gymnastic feats to the mentally handicapped, and it is on this basis that the teacher of the mentally handicapped must prepare his/her physical education programme.

First one must consider the basic directions of movement (i.e. forwards, backwards, and sideways), in their simplest exercise form being:

1. walking forwards,
2. walking backwards,
3. walking sideways.

If the above can be taught with the child being made aware of normal posture, then the teacher has laid the foundation on which limitless progressions can be built.

Posture is described as the power of perceiving, without seeing, the position in which the limb has been placed. On purely anatomical considerations it is considered that normal posture is obtained when the line of gravity intersects the vertebral bodies at the cervico-dorsal and dorso-lumbar junction, and falls in front of the sacroiliac articulation.

Good posture should be associated with extension. For example, a person dragging his feet when walking is lacking extension, so has bad posture. In effect he has become part of the ground on which he walks. A child, when standing, must be taught to decrease his base of support by bringing his legs and feet together. His shoulders should be drawn back, and his chest and head held high; the arms should be fully extended by his sides, and his fingers outstretched (clenched fists must be discouraged). The teacher must always aim for this perfection in body position.

When sitting on the floor good posture can be practised by ensuring that the child does not sag into the floorboards, but 'sits high'. He should be taught to sit with legs outstretched and together, with the toes pointed. The palms of the hands should be placed flat on the floor close to the hips with the fingers pointing forward. Again, aim for full extension and a pleasing bodily appearance.

One could write at length theories on normal walking posture. This we feel would be of little benefit to the teacher of the mentally handicapped who must deal with the very difficult practical application. If the following points are borne in mind, the teacher will have a clear picture of the development of a good posture in walking.

Bad posture in walking produces an ever-widening base of support. The legs become straddled, and the shuffling gait becomes obvious. Through lack of muscle tone the whole body begins to sag.

The aim must be to decrease the base of support by the legs being brought together, and the body made to stand erect. An even rhythm must be developed in walking. Do not think of the floor as a landing platform for each foot, but try to use it as a point for take-off. Spinal deformity presents the biggest problem when dealing with posture correction. The treatment of all cases of this nature lies in the hands of the medical officer who will advise the physiotherapist which treatment courses to take. However, by close co-operation with the medical staff, the physical education teacher is in a unique position to achieve remarkable results.

The following are some of the spinal deformities encountered:

Kyphosis—a backward curvature of the spine (humpback).
Lordosis—an abnormal curvature of the lumber spine.
Kypho-lordosis—a combination of both the above.
Scoliosis—a lateral curvature of the spine.

In severe cases a patient can have a combination of the above.

How best can we tackle the problem of posture, and develop in the mentally handicapped child a feeling for movement? Firstly, we would advise the teacher to obtain at least an elementary knowledge of the skeletal structure of the human frame, to note carefully all the moving parts and the degree of movement obtainable at each joint. It is then that this knowledge can be put to practical use during the physical education lesson.

If the teacher can, over a period, teach the child to perform a set of exercises whereby all the joints of the body are put through their full range of movement, then the real significance of physical education has been grasped.

Let us take three simple exercises where the shoulder joint is put through its full movement range:

1. arms circling forwards,
2. arms circling backwards,
3. arms rising sideways.

The following are coaching points which must be observed. Check the starting position and correct (manually if required) any tendency to bad posture; legs and feet must be placed together, arms straight and placed by the sides with fingers extended. The body must present a pleasing, relaxed appearance. We must remember that in all gymnastic exercises the body reaches a degree of discipline which is never harsh or unnatural. The arm circling must be performed with straight, relaxed arms. Try to brush the ears with the upper arms.

To obtain the full remedial benefit and stimulus from any exercise, the child must be taught the importance of correct breathing. In the above exercises, the child should be taught to breathe in deeply as the arms are raised and breathe out as the arms are lowered. Breathing during exercise should not be carried out to numbers, but should be developed naturally. The best method to apply is for the teacher to say 'Let me hear you all breathe in', then 'let me hear you all breathe out.' Then the teacher should go round the class instructing individually.

During exercise it is not vitally important that the child breathes only through the nose. The main concern is to increase the oxygen intake by filling the child's lungs with air to a greater capacity than perhaps ever before. Mouth breathing during exercise can be encouraged.

We have outlined briefly some of the important aspects of remedial physical education when dealing with the mentally handicapped. However, it should be noted that the rate of progress will have to be adjusted to the individual's capabilities. The work we have described cannot be achieved in a few weeks. It may be many months before any real improvement is seen.

The following points should be noted: each exercise or skill taught will have to be split up into sections or leading-up stages; one, or perhaps two of these sections should be included in the normal physical education lesson; the time taken to complete the whole exercise must be dictated by the child's ability.

Any exercise which is aimed at posture correction is extremely tiring. For example, putting a child in correct posture and asking him to hold this position is a heavy physical and mental demand. When any sign of fatigue is shown, the child should be allowed to relax into his normal position and continue with another less demanding activity.

7

The problem of the brain-injured child, with special reference to cerebral palsy

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DEFINITION

For many years difficulty has been experienced in deciding on a satisfactory definition of cerebral palsy. At the last meeting of the World Commission on Cerebral Palsy held in Germany in September, 1966, the following was adopted as the official definition: 'Cerebral palsy is a persistent but not unchanging disorder of posture and movement due to dysfunction of the brain present before growth and development are completed.' Many other features are part of this picture, among them being epilepsy, mental retardation, and some sensorimotor defects. It is interesting to note that the meaning of cerebral palsy has been steered towards disorders of posture and movement, in keeping with Bobath's (1966) ideas and explanations. The current definition stresses, also, the fact that the lesion affects the 'developing' brain. The stage at which the brain ceases to develop has not, however, yet been defined.

Every cerebral palsied child has some lesion of the brain, but a brain-injured child is not necessarily cerebral palsied. Nevertheless, the educational problems presented by all brain-injured children are similar. Diverse terms are now in use that denote the same meaning and implications, as, for example, 'brain damage', 'minimal cerebral damage', or 'minimal cerebral dysfunction'. These refer to children who have no obvious clinical signs of a lesion of the brain. Some clumsy children would fall into this category as well as some with minimal signs of hypotonia, mild tremor, unsteadiness of gait, and possibly some with handwriting problems. Many of these children have specific learning disabilities and will have difficulty in reading, writing and especially in arithmetic. They will have problems of perception which will interfere with their discernment of geometric forms, important forms which are basic to the way in which we symbolize our letters and numbers. Many of these defects are difficult to assess, requiring the use of special techniques in their elicitation. Dr. Frieda Holzel, working at Rodney House Cerebral Palsy Nursery Clinic in Manchester, has done considerable research on this problem. She has allowed me to quote some of her results, and these will be used later in this chapter. In the field of education these problems are also being studied, and in the Autumn 1966 issue of *Special Education* Helen Shields described how she taught a brain-injured child, with virtually unintelligible speech, to read.

Some of the children suffering from cerebral palsy are of normal intelligence, but more than half of them are intellectually retarded. (Athetoids are least so affected.) Most of these retarded children are educationally subnormal, and about one-quarter are not able to benefit at all from schooling. There is insufficient accommodation in this country for brain-injured children in any of these categories. Many young children, particularly those who live in rural or semi-rural areas, or in the smaller industrial centres, have to be sent away from their homes to residential schools. This would be a traumatic experience even for a normal child of 5 years, and is, in my opinion, much worse for a child with physical and associated difficulties. Nevertheless, where there are not enough facilities available locally the lesser evil for the child is to be sent away from home. The child's intellectual development will, to a large extent, determine his placement in society after he leaves school. There are few cerebral palsied individuals in the world who can achieve similar success to that of Dr. Trafford Barlow of South Africa—now a retired civil servant. He is a severe athetoid, reasonably mobile, but with an abnormal gait and his speech is difficult to understand. He grew up at a time when there were no special facilities in South Africa for the welfare of such patients. He said to me once, 'I was born a generation too soon'. I doubt, however, if the facilities now available could have produced a better result. In addition to his own high intelligence, he had the support and help of two intelligent and good parents. With their assistance he qualified in law with a doctorate degree (LL.D.), which made it possible for him to be appointed as a Law Adviser to the South African government. During his working life he wrote several textbooks on law. There are numerous examples of cerebral palsied individuals who have benefited from a university education. But it is nevertheless true that the majority are educationally subnormal, and those with normal intelligence are usually average, or low average. Teachers of these children must, therefore, obtain the maximum effort from their pupils. This entails becoming acquainted with their medical problems and working very closely with various therapists, so that all have a common aim in their treatment. Teachers should understand something of the causes, some details of the diagnostic criteria, and some of the technical terms used.

CAUSES OF CEREBRAL PALSY

There are numerous possible causes of cerebral palsy. Some are proven, some are deduced. In recent years large-scale studies have been initiated, which are planned to provide more precise information. It is convenient to classify causes as those occurring before, during, or after birth, and to accept that in a certain number of cases the cause is entirely unknown. A frequent factor is interference with the supply of oxygen to the brain. Hypoxia or anoxia, from whatever cause, if sufficiently prolonged, will induce damage to nerve cells. During pregnancy the common cause of hypoxia is partial separation of the placenta, manifesting as a haemorrhage. Toxaemia of pregnancy can affect the foetus both directly and indirectly. The effect on the foetus of maternal infections such as rubella (German measles) and toxoplasmosis are well known. Much less is known about the direct effect on the foetus of other infectious diseases. The common bacterial infections, such as pneumonia, may have an indirect effect as a result of their toxicity. Any serious illness during the course of a pregnancy may induce a premature birth, and it is from among the premature infants that about one-third of the cerebral palsied are derived. In the perinatal period anoxia again plays an important part, but direct injury to the brain may also occur. At times it is difficult to determine the primary cause, as the clinical picture of difficult breathing due to brain injury or to respiratory distress may be identical. Oxygen lack in the perinatal period may be due to mechanical obstruction to the airway of the infant, such as by the inhalation of foreign substances present in the maternal passages, consisting of blood, mucus or vernix caseosa. It may be due to the action of anaesthetic or analgesic drugs on the respiratory centre of the newborn. These drugs, given to the mother to relieve her labour pains, may pass through the placenta and act on the infant. There may be abnormalities of the placenta, of the placental site, or of the umbilical cord, such as knots or prolapse of the cord. Direct injury to the brain is usually due to complicated labour brought about by disproportion between the foetal head and the pelvis, by malposition of the foetus, or by difficult delivery with obstetric forceps. This type of injury is very much on the decline as a result of improvement in obstetric techniques.

Prematurity makes the risks greater. Soon after birth the respiratory distress syndrome adds to the incidence of anoxia. Excessive jaundice from whatever cause, be it the rhesus factor, ABO incompatibility, drug reaction, or prematurity, may be responsible for kernicterus (nuclear jaundice), a severe form of brain injury in which the nuclei or aggregations of cells at the base of the brain are affected by an excess of bilirubin in the blood of the infant. This condition can, to a large extent, be prevented by blood exchange transfusions in which the infant's blood, with excess of bilirubin and noxious antibodies, can be exchanged with appropriate blood from a donor.

Relatively few cases of cerebral palsy originate after the neonatal period. But with increase in motor traffic more children will inevitably be involved in accidents, and there is likely to be a rise in the incidence of head injuries. While bacterial infections of the brain causing meningitis are today to a great extent cured by antibiotics, viral infections causing encephalitis do not respond to any specific treatment. Many children are permanently brain injured as a result.

Congenital abnormalities of the brain, although relatively uncommon, do occur, and there are an appreciable number of children with hydrocephaly, microcephaly, and vascular anomalies. Spina bifida, with or without hydrocephalus, will largely increase the numbers of children suffering from cerebral palsy, as a result of the increasing numbers of children whose lives are saved by modern surgery.

Discoveries in medicine are enabling us to sort out forms of brain injury due to biochemical causes, such as anomalies of amino-acid metabolism (phenylketonuria), anomalies of enzymatic activity (galactosaemia), and anomalies of hormone action (hypoglycaemia, cretinism). Some of these abnormalities can be prevented by very early diagnosis, suitable diets, and treatment with drugs.

An understanding of the causes of cerebral palsy enables one to get some idea of the nature and extent of the damage done to the brain. It also helps us to appreciate the significance of some of the varied phenomena that occur. It is obvious that anoxia, hyperbilirubinaemia and inflammation of the brain cannot possibly be so selective as to pick out certain isolated specific areas for their assault. The lesions must be, and in fact are, more generalized than the physical signs denote.

The term 'cerebral palsy' includes a variety of types. As in other newly discovered branches of medicine, classification is difficult, and many writers use terms differing in meaning from the same terms used by other writers. So much so, that the World Commission on Cerebral Palsy recommends that, at the end of every article, an author should define the technical terms he uses. For example, there is an objection to the suffix 'plegia' which is commonly used, on the grounds that its meaning is 'paralysis', and cerebral palsied children are not paralysed. 'Paresis' is offered as an alternative, and it is recommended that the term 'hemiparesis' should replace 'hemiplegia'. Definition of the words commonly used in cerebral palsy gives some conception of the various types of cerebral palsy, and some of the more important features of the condition. Spasticity occurs in about 75 per cent of all cases. It is characterized by a specific type of resistance to muscular movement, in which there is a stretch reflex manifesting itself when an attempt is made to move the joints. The opposing muscles contract and block the effort. There are also increased tendon reflexes and an extensor plantar response (i.e. an upgoing big toe on stroking the sole of the foot). There is a great tendency to contractures and the development of postural deformity. The extent of the spasticity is indicated by the number of limbs involved. In infants, however, many of these signs are variable or may be absent. 'Spastic quadriplegia' is a term used when all four limbs are affected. There are, however, some equivalent terms with slight differences in their nuances. 'Tetraplegia' is a term synonymous with 'spastic quadriplegia'. 'Diplegia' indicates that the lower limbs are more involved than the upper; in 'double hemiplegia' the upper limbs are more involved than the lower; in 'spastic triplegia' three limbs are involved; in 'spastic hemiplegia' the upper and lower limbs on the same side of the body are affected; and in 'spastic monoplegia' only one limb is involved. In 'spastic paraplegia' the two lower limbs only are affected. At times there is a minimal degree of spasticity and few neurological signs, but there may be a marked functional disturbance with interference of the normal use of the limb.

Spasticity is generally considered to be due to a lesion of the pyramidal tract (the long nerve fibres which commence as nerve cells in the motor cortex of the brain and which cross over in the medulla oblongata to the opposite side of the spinal cord). Dyskinesia is due to an extra-pyramidal lesion in which the basal nuclei are injured, resulting in an impairment of the control of body movements. In dyskinesia involuntary movements of the limbs and trunk occur, and, included in this term, are signs which could well be covered by the word 'athetosis', which means 'without fixed position'. As used, however, by Perlstein (1952) of Chicago, and Ingram (1964) of Edinburgh, finer distinctions are made, and under the general term 'dyskinesia' the following descriptive words have been adopted. In 'dystonia' abnormal movements are present, primarily in the proximal parts of the limbs; they are slow and writhing in character. In 'chorea' movements of a more rapid nature are also present in the proximal parts of the limbs. 'Athetosis' affects the distal part of the limbs, the extent depending on the severity of the brain lesion. The movements are slow and writhing, made worse by voluntary activity and usually absent at rest, but in severe cases may be continuous. In mild case peculiar but characteristic movements of the fingers may be the main manifestation. In severe cases tension may occur in which there is generalized contraction of the body musculature resulting in extensor or flexor patterns of posture, which may be mistaken for spasticity. It is rare to find only one of these types of abnormal involuntary movements present in a patient, and there often occurs a combination of dystonia, chorea, and athetosis, hence the term 'choreo-athetosis', with or without tension. 'Ataxia' is usually associated with a lesion of the cerebellum which, according to Mackenzie (1936), controls articulation, equilibrium, and movement. The signs are those of nystagmus, a swaying gait, intention tremor, past pointing, and speech defects of a jerky slurring nature. Ingram describes two types of ataxia, one of which he calls ataxic diplegia, and the other ataxia. In the former, signs of ataxia are associated with those of spasticity, especially in the lower limbs. Epilepsy occurs fairly frequently and hydrocephalus is a common cause. In both types congenital factors are prominent. Many ataxic children are retarded.

Less common types of cerebral palsy occur, such as the rigid, the atonic, and tremor types. These are very rare and can be difficult to diagnose in the early years.

ABNORMALITIES OF SENSATION AND PERCEPTION

Dr. Frieda Holzel, during 1966, followed up 92 children who had passed through Rodney House, and who had been placed by the local education authorities in the type of school considered most suitable for each individual. The sample was, to some extent, selected, as these were obviously the least handicapped cases. Of the 92 children, 83 per cent were spastic, and 9 per cent were athetoid. The rest were suffering from minimal degrees of cerebral palsy. Of the 83 per cent spastic children more than half (57 per cent) were hemiplegic, and of these 32 per cent were right-sided and 25 per cent left-sided. The hemiplegics proved to be of great interest as most of them had not achieved a level of academic attainment commensurate with their intelligence. There were varying degrees of perceptual and sensory disabilities in 85 per cent (44 out of 52). Stereognosis (the ability to recognize by their feel various objects placed in the hand) was disturbed. Dr. Holzel was able to distinguish, by suitable testing, children who had loss of perception in spite of intact sensory information. The inference she draws is that a different approach in the education of these children is essential if one is to achieve any measure of success. Gardner (1961) found that there was considerably more impairment in his group of left-sided hemiplegics than in his group of right-sided hemiplegics. Dr. Holzel could not confirm this. In the rest of the spastic group there was relatively little loss of tactile, visual, and perceptual discrimination. Few of these children had unexpected learning problems. There was a difference in drawing ability in hemiplegic and diplegic children; the former had difficulties with two-dimensional shapes and problems of laterality, whereas the latter had difficulties with perception of three dimensions. None of the athetoid children showed any appreciable disorder of visual perception. Of the group of 7 children with 'minimal cerebral palsy', most had some learning problems which Dr. Holzel considers might possibly be due to lack of absolute determination of laterality. Many showed signs of the 'brain-injured' syndrome, such as distractibility and lack of concentration. They also had visual, sensory, and perceptual impairment of varying intensity. Dr. Holzel concludes that:

1. Intelligence assessment and the degree of perceptual loss do not necessarily convey a full picture of the child's disability.

2. The perceptual impairment arising from a sensory defect will have to be assessed differently from the defect of perception without sensory loss.
3. Right or left laterality do not play an important part in perceptual impairment; undecided laterality has greater significance.

The results of Dr. Holzel's study indicate clearly the importance of adequate and detailed medical, psychological, and educational assessment of the cerebral palsied child. Some perceptual defects as shown by children's drawings are illustrated on pp. 117–19.

ABNORMALITIES OF THE EYES

Many cerebral palsied children have visual impairment, and it is essential that all should have their eyes examined. Mr. R. M. Ingram, ophthalmic consultant at Rodney House, has recently made a preliminary survey of 80 patients whom he has examined in an 18-month period. About 35 per cent of these children have some defect of the eyes and about 25 per cent of all patients have strabismus. (In the general population the incidence of strabismus is 1 to 2 per cent.) All of them appear to be of the non-paralytic type, and were treated either with glasses or by surgery. There were 4 cases of congenital nystagmus and, of the rest, there were single cases of patients with high myopia, ptosis, sympathetic nerve lesion, and optic atrophy. There was one child with the Sturge-Weber syndrome, who had an associated glaucoma of the congenital type. There were a number of children who obviously had a cerebral defect because, although they responded to light stimuli, they could not appreciate the significance of what they were seeing. This was quite different from the perceptual problems of some brain-injured children. It is actually a form of cortical blindness and is associated with severe degrees of mental retardation. Why are there so many children with squints in this group? The answer is, as yet, not known. Some authors consider that many of these children's squints are analogous to the physical lesion, that a spastic quadriplegia has a spastic paralysis of the ocular muscles, and that a state of athetosis will produce an equivalent defect of the eye. If this were completely correct one would expect to find most of these strabismic children to be surgical failures, but this is not so. There are, of course, definite cases of nystagmus due to cerebellar lesion, and the movements of the eyeballs interfere with vision. Grace Woods (1957) claims that most of the abnormalities are directly related to the brain injury and they include blindness, impaired vision, defective eye movements, and defects of the visual fields. At Rodney House there are 2 children who made remarkable improvement in many directions when glasses were prescribed. They are now able to see, and do things which were impossible for them in the past. Even their speech has improved.

PROBLEMS OF HEARING AND COMMUNICATION

Of 85 children attending Rodney House in a period of 18 months, only 21 had normal speech. All cerebral palsied children attending the clinic at the Duchess of York Hospital for Babies and at Rodney House Cerebral Palsy Nursery Clinic are referred to the Department of Audiology and Education of the Deaf at the University of Manchester for assessment of their hearing. Fundamentally, hearing is so closely connected with speech that it is impossible to separate them into watertight compartments. When a child has a speech defect it is essential to determine whether this is due to a hearing defect, to a form of dysphasia, or to mental retardation. Mechanical difficulties causing dysarthria are usually very easy to determine clinically, but it may be difficult to sort out the others, especially when several factors are present in the same patient, as the following history of one particular child illustrates. She is now aged 8 years, and has been under close medical, audiological, psychological, and pedagogic observation from birth. She was a premature, rhesus-sensitized baby, severely jaundiced at birth, requiring three exchange transfsions. She is a moderately severe non-tension athetoid. Her story is one of continual difficulties and delayed development. At the age of 20 months she used the word 'hello' and this was the only words she used for the next 20 months. At that time she stopped using even this one word. At present she has very little language, but is making meaningful sounds. She makes herself understood, and understands a great deal. Athetosis was diagnosed at the age of 15 months. At 19 months she was admitted to Rodney House where she stayed until she was 6 years old. She was recommended for admission to one of the assessment centres of the Spastics Society when she was 5 years old, but on account of administrative difficulties she was not taken in. She was about to be admitted to an excellent school for physically handicapped children in Manchester, when the parents moved to Cheshire, and so this also fell through. Eventually she was sent to a centre for severely retarded cerebral palsied children, where a great deal was done to stimulate her speech. She was provided with a home teacher at the centre; a peripatetic teacher of the deaf advised about her speech training. In spite of this she made very little progress in speech. She has, however, been encouraged to socialize and to fit into school activities. A few months ago she was admitted to a school for the deaf, which has special facilities for teaching children with communication difficulties.

As hearing difficulties are well-known complications of kernicterus, the child was under continual observation for deafness. At the age of 1½ years a hearing defect was suspected. At the age of 3½ years a hearing aid was recommended but, for various reasons, was not used. At the same time there were immense social problems at home, as the maternal grandparents were seriously ill in the child's home over a long period. This interfered with the attention that should have been given to this child. At the age of 4 years the degree of her hearing disability was again discussed. It was then decided that she could hear reasonably well, and that she was not a suitable case for a school for the deaf. A sleeping audio-electroencephalogram at the age of 4½ years revealed no evidence of peripheral deafness. At this stage she was diagnosed as suffering from mental retardation with, possibly, impaired hearing. At the age of 7½ years she was re-investigated with the following results:

> Hearing showed a high frequency loss.
> Intelligence was below the normal average (IQ = 74 Leiter International Performance Scale), and her lack of speech was considered to be mainly due to dysphasia.

It is felt that this is probably the most accurate assessment hitherto made, and that her present placement is most suitable for her.

This case history demonstrates some of the difficulties facing the child with cerebral palsy, and it also demonstrates some of the difficulties encountered by those involved in diagnosis and treatment. The case has been, from the start, a most difficult diagnostic problem. Her physical state was easy to assess. By looking at her one could immediately state that she was a non-tension athetoid of moderate severity. She is, to a large extent, independent, and can manage with little assistance the ordinary activities of daily living. What was difficult was the assessment of the factors involved in the failure to develop speech, and subsequently her placement in a suitable school. She should, in fact, have been sent to her present school several years ago. This was proposed earlier, but not done on account of the doubt about the degree of her hearing disability. It must be remembered that some of the most eminent experts in this country, both in Manchester and in London, had been examining her. This case demonstrates how difficult it can be to assess the intelligence of a cerebral palsied child. Bobath (1966) has described the 'intelligence quotient' as meaningless as a telephone number. While the results of psychological assessment should not be ignored, it is important that several different types of test be employed by a psychologist, and that the psychologist be experienced in the testing of brain-injured children. A difficult case should be re-assessed at fairly frequent intervals, and all those handling such a patient should be consulted before a final opinion is given. In fact, such a patient necessitates a 'round table conference' of everyone connected with the case; the information given by the nursery assistant who takes care of the toileting can be as significant as the tests of the most experienced professional expert. This case also demonstrates the unnecessary complications caused by the multiplicity of authorities that, at present, deal with a child's medical and educational needs. It has been said with truth that an English child living on the right-hand side of a street may have considerably more (or considerably less) facilities, than that same English child living on the left-hand side of the same street—if the street happens to be a boundary between two local authorities. Finally, the difficulties experienced with this child demonstrate the great lack of facilities in this country as a whole for children with multiple handicaps, including speech.

It is essential that a dual service be provided for the actual treatment of speech defects, mainly the dysarthrias, and for the teaching of language as such. This needs to be started early in the patient's life. The great importance of speaking to their child at very close range, and of facing the child, thereby providing the greatest stimulation to the auditory and visual senses, must be brought to the attention of parents. One does not have to speculate on the importance of communication. It is the basis of human society. It is not essential, albeit very helpful, to walk and to move around, but it is important to make oneself understood by one's fellow men. In the last few years a great deal of attention has been given to the improvement of typewriters, to make at least one sort of communication easier for the cerebral palsied. Various modifications were made to the ordinary typewriter, to assist a child with control of his hands. It was then found that an electric typewriter was easier to use as less power was needed to depress the key. There were still, however, great difficulties for some children. With the aid of electronic devices, new and practical adaptations have been made with special keyboards and remote control, to enable, for example, an extremely handicapped athetoid to use such a typewriter. The P.O.S.U.M. apparatus is one type. There is one invented by Micheelsen of Denmark, and one by the electronics department

Drawn upside down, pencil gripped in clenched left fist; verbalized each feature.

head
hair
eyes
eyebrows
glasses
mouth
nose
collar
shirt
legs

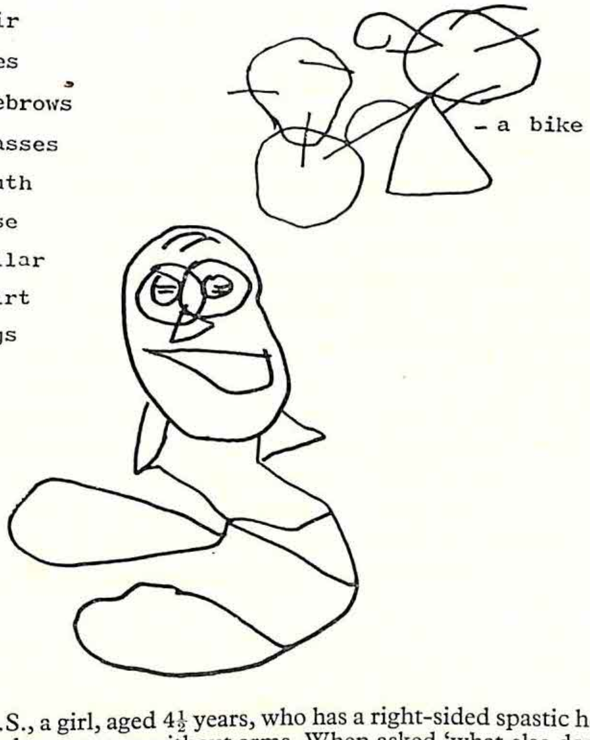

Fig. 7.1 A.S., a girl, aged 4½ years, who has a right-sided spastic hemiplegia, consistently draws a man without arms. When asked 'what else does the man have?' the answer was 'a bike', which she immediately drew.

of the Engineering Faculty of Sheffield University in England. At the recent conference of the International Society for the Rehabilitation of the Disabled, typewriters were shown that could be activated by light from a head torch onto a photo-electric keyboard affixed to a wall. Gadgets that could be used by the mouth or by the feet were relatively simple modifications of this. They will be a boon to those with difficulty in writing.

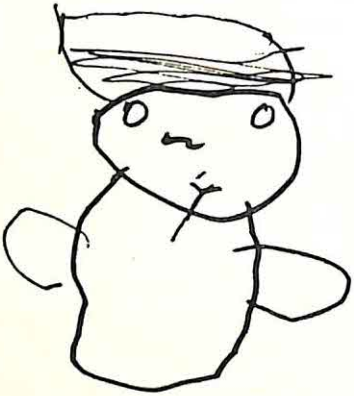

Fig. 7.2. J.L., a girl aged 5½ years who is unable to walk, draws a man consistently without any legs. Parts of the body have been added to, when questioned by the teacher (hair, a hat, a cigarette).

Writing and typing presupposes a reasonable standard of education. The question arises of how to teach children, even of normal intelligence, who have impaired sensory and perceptual abnormalities. The work of investigators such as Dr. Holzel is beginning to reveal to us some of the problems involved, and the importance of sorting out the exact nature of the defect. It is essential to determine which child needs to be taught by simple repetition, and which needs extra visual and tactile aids. The education of the cerebral palsied child calls for dedicated teachers, with original and ingenious ideas. Such a teacher is Ann Mathams, of Westerlea School in Edinburgh. To watch her at work in the classroom is an inspiration in itself. It is a heartening experience to see the enthusiasm, initiative, and inventiveness with which her pupils are being taught. Each child is studied individually. His learning capacity and learning difficulties are determined. He is then taught according to his own aptitude. The major problem is to find a suitable way of getting through to the

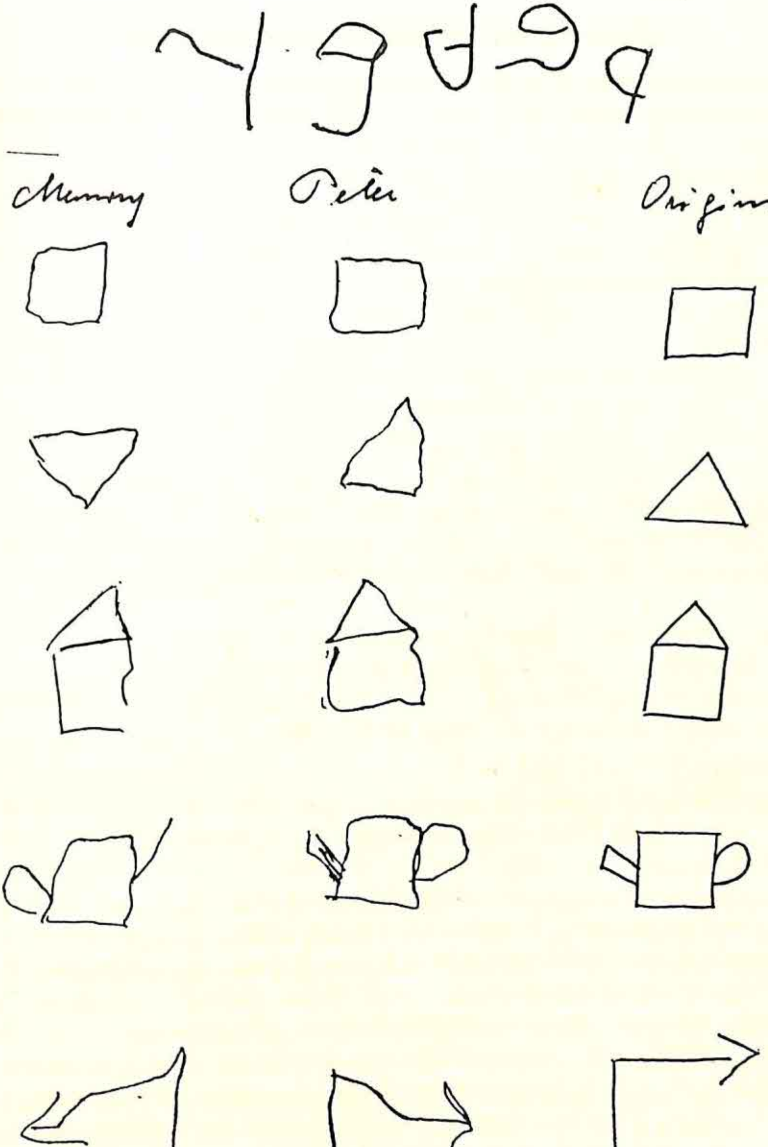

Fig. 7.3 P.C., aged 6¼ years, is suffering from a relatively mild degree of spastic quadriplegia. He is having great difficulties at school and does not learn his letters or words easily. A study of his mirror writing and drawing explains his difficulties. He should improve with intensive personal tuition.

child and establishing a means of communication between child and teacher. The children require simple methods of indicating answers, and 'yes' and 'no' signals are used by those unable to make an oral response. They use eye signals, nodding, looking at the signs placed on the walls, or banging a bell. Number symbols have been hung on to the walls. An electric alphabet, which is controlled by the child, lights up letters. There are numerous other pieces of apparatus, all of which are being adapted to the needs of a particular child.

CONVULSIONS

Epileptiform fits of various kinds occur in about 40 per cent of all cerebral palsied children. Of these, about 30 per cent have major convulsive episodes, characteristic of the grand mal type of epilepsy with generalized convlusions and unconsciousness. In a lesser number of hemiplegic patients the Jacksonian type occurs, in which there is jerking in the affected arm and leg, frequently without loss of consciousness. About 25 per cent of the patients have petit mal attacks with momentary loss of consciousness, or myoclonic spasms in which there is a sudden forward flexion of the body. In the former the child has a sudden glazed look, a blackout, or just a staring attack which lasts for a few seconds. In the latter the flexor spasm is the commonest form and consists of a brief, sudden, and generalized jerking. The arms are flung out, and there is flexion of the trunk and thighs at the hips. Hence the name 'salaam' type of epilepsy. Jeavons and Bowe (1964) have extracted 21 names for this condition from the literature. Some children with this type of epilepsy have characteristic encephalographic appearance called hypsarrhythmia. If diagnosed in the early stages, some of the children with this particular type of fit may improve on treatment with steroids. The usual anticonvulsants have little effect on infantile spasms. They do help to control most other forms of epilepsy. In doing so, however, they have a depressing action on the intellect. This, in itself, may have a retarding effect on the child's development. It is possible for a child to live in a 'twilight' state from the effect of the drugs. This must, of course, interfere tremendously with educational progress. The implications of brain injury resulting in cerebral palsy, epilepsy, major disturbances in the visual and auditory perception with difficulties in concentration, with distractibility and with possible mental retardation, aggravated by powerful anti-convulsive remedies, are a tremendous challenge to any teacher.

These physical and mental factors, originating in some form of brain lesion, create great difficulties for parents, teachers, and, of course, for the children themselves. It becomes necessary to re-orientate our ideas on the relationship of the medical doctor to the teacher. The word 'treatment' is hardly relevant to the situation. There is, in fact, no adequate term to describe what we should do. Do we 'treat', 'train', 'educate' the child, so that he grows up to be as normal as possible within the limits of his disability, and able to take a place in society as a useful and productive member? These functions must be carried out contemporaneously, and there must be co-operation amongst the various members of the team who are handling the child. Teachers still have to do research in the techniques of teaching these children. No breakthrough has yet been made.

The importance of the provision of the right environment is, fortunately, now realized. Bright, airy, pleasant, well-lit, well-designed buildings are important for normal children. They are even more important for the handicapped. A school housed in an ancient mansion cannot serve as well as a building designed for the purpose of teaching. A school for physically handicapped children must be designed differently to the school for normal children. Fundamentally it must be not only utilitarian, but also pleasing to the senses. May I put in a plea for the greater use of our wealth of visual art, paintings and sculptures which could be loaned to schools, and also for the greater use of music in the education of our children.

An attempt has been made to describe the difficulties confronting the brain-injured child. These can be overcome only with the combined efforts of teacher, doctor, psychologist, and social worker, backed fully by local and central health and educational authorities.

GLOSSARY OF TECHNICAL TERMS

(*Not found in the Concise Oxford Dictionary*)

ABO blood group—the general term given to the various groups of red blood corpuscles in different human beings. There are four such groups: Group A, Group B, Group AB, and Group O.

Anoxia and *hypoxia*—conditions in which there is an inadequate supply of oxygen to the tissues, and which damages brain tissue more readily than other tissues of the body.

Cretinism—a disease due to defective thyroid function in foetal life or in early infancy. It can be readily controlled by the administration of thyroid hormone.

Dysphasia—a term which is displacing 'aphasia', means loss of the power of speech. In cerebral palsied children the power of speech has not been attained and it may manifest itself as an expressive or perceptive dysphasia.

Galactosaemia—a relatively recently discovered disease, which is due to lack of a certain enzyme. This results in lactose (the sugar of milk) not being split to form galactose. It is a serious condition which may result in mental retardation, among other visceral abnormalities.

Grand mal—the form of epilepsy resulting in major convulsions.

Hypoglycaemia—too low a level of blood sugar resulting in convulsions and, at times, causing permanent brain damage.

Hypotonia—lowering of state of muscle tone, manifesting itself as muscle flabbiness or weakness.

Hypsarrhythmia—the appearance of the electroencephalogram in certain types of myoclonic epilepsy.

Medulla oblongata—the portion of the brain connecting the midbrain with the spinal cord. Contains vital centres of the brain, such as the respiratory and cardiac centres.

Myoclonic spasms—sudden contractions of the body musculature, occurring frequently in some brain-damaged children.

Neonatal—the first month of life.

Nystagmus—oscillations of the eyeball, present in certain diseases or of congenital origin, when the patient turns the eyes to the extreme limits of peripheral vision.

Phenylketonuria—a severe form of mental deficiency caused by the body's inability to metabolise phenylalanine.

Pyramidal tract—the pathway of the nerve fibres from the cortex of the brain to the spinal cord. They pass through the pyramids of the medulla where the majority of the fibres cross over the mid line to the opposite side. Hence an injury to one side of the brain will cause paralysis of muscles on the opposite side of the body.

Rhesus factor—present in 85 per cent of the population, who are stated to be rhesus positive. It is an antigen present in the red blood corpuscles. When a rhesus-negative pregnant woman carries a rhesus-positive infant she may develop antibodies in her plasma against the rhesus factor. These antibodies pass back to the infant before or during birth and cause destruction of the rhesus-positive red cells in the blood of the infant. Hence the need for exchange transfusion.

Spina bifida—a condition in which there is lack of fusion of parts of the vertebral column which may result in the contents of that part of the spinal canal protruding outside the spinal canal. It may be completely invisible on the outside (spina bifida occulta) or there may be a protrusion consisting of skin and meninges (the lining of the spinal cord). It is frequently associated with hydrocephalus.

Strabismus—commonly known as a 'squint'.

Sturge-Weber Syndrome—named after two doctors. In this condition an extensive vascular naevus is present on the face and head, spreading through the skull to the brain. This results in destruction of the affected brain tissue.

Toxaemia of pregnancy—a toxic condition in the pregnant woman which causes a raised blood pressure and albumin in the urine.

Vernix caseosa—the white fatty material covering an infant's body at birth.

Visual field—the total range of vision of the human eye, including objects behind the horizontal plane of the eye.

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